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The Anatomy of Earnings Behavior

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INTRODUCTION

Earnings from wages and salaries constitute two-thirds of the total personal income received by households and more than half of the total of all payments generated by the gross national product. As the economy grows and develops, wage and salary earnings also change. Increases in the population bring more wage and salary earners into the labor force. Retirements and deaths reduce the labor force. Productivity increases lead to increased earnings, and changes in labor force participation also have major effects. In the shorter run, changes in the level of economic activity and differences in the rate of inflation affect the behavior of total earnings and of the earnings of different social and economic groups. A better grasp of these relationships is needed, to understand both why total wage and salary earnings as they appear in the national accounts change

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as they do and how different socioeconomic groups gain or lose, both in absolute terms and relative to one another.

The degree of disaggregation currently available in the national income accounts is not sufficient to provide a basis for this type of analysis. Although wage and salary earnings are given quarterly by industry, no information is provided on the age, sex, and race of the wage and salary recipients; on the size distribution of wage and salary earnings; on exits from and entrants into the labor force; or on the distribution of changes in earnings among different socioeconomic groups. Information of this type is needed in order to elucidate the processes of evolutionary economic change and the effects upon such evolutionary change of short-run changes in the level of economic activity and inflation. However, abandonment of the national income accounting approach is no solution. Independent studies of age profiles, lifetime earnings patterns, sex and race differentials in earnings, labor force participation, size distribution of earnings, and changes in income of different socioeconomic groups would lead to a maze of conflicting observations that would be impossible to integrate into a cohesive whole. Ideally, one would like to be able to disaggregate total wage and salary earnings into components that would permit evaluation of the importance of different factors relative to one another and to the behavior of total earnings.

THE NATURE OF THE LEED FILE

A partial solution to this problem can be found in the LEED file of the Social Security Administration (SSA). The SSA has created a one percent sample of the social security files in such a way that it yields a Longitudinal Employee-Employer Data (LEED) file. In each year, the reports by employers for all social security numbers ending in a given series of digits are selected and matched over time to provide a complete set of employee-employer records for each individual in the sample. Such a procedure not only brings together all of the information pertinent to a given individual, but it also automatically brings in the new entrants into the labor force in the proportion in which they occur, and the absence of employee-employer records automatically reflects exits. The basic information provided on each individual includes age, sex, and race, and for each quarter of every year, the amount of wages paid to the individual by each employer. There is, however, a cutoff point established in the social security law beyond which wages are no longer reported. Since the Federal Insurance Contribution Act (FICA) tax is applied against total earnings as they are paid, the effect of this provision is to stop the

reporting of income at the point in the year when the limit for any one employer is reached. If an individual is receiving earnings from several employers, each would be reported separately, and the limit would apply to each individually. Although the Social Security Administration does compute an estimate of total earnings for the year in those instances where the limit is reached before the end of the year, it is obvious that the early part of the year will be more fully reported than the later part, and the estimates for these early quarters will more fully reflect the national totals. For the purposes of this study, therefore, the analysis will be confined to the first-quarter data, which are relatively unaffected by the taxable limit, and which, in addition, reduce the influence of seasonality.

It should be pointed out that the LEED file does not contain various sorts of social and demographic information which would be very useful in the analysis of earnings behavior. Thus, for example, no information is provided on education, occupation, or marital status of individuals; the data, furthermore, refer solely to total earnings paid, and no information is provided on the number of hours worked. Thus, earnings may be low either because the wage rate is low or because the employee worked for only a fraction of the period or on a part-time basis.

Despite these deficiencies, however, the LEED file is still a rich source of data. It is an extremely large sample, equal in magnitude to the 1 percent Census Public Use Samples. In contrast to the Public Use Samples, however, it follows each individual over a substantial period of time (1957–69), so that year-to-year changes for specific individuals or groups can be observed. Although other panel history sample surveys are being developed, most of them cover very much smaller samples and cannot be successfully disaggregated to show the anatomy of the total wage bill in the national economy.

The social security system covers about 90 percent of total wage and salary employment. Certain government employees are excluded, and there are a small number of other groups who, like the railroad employees, have their own pension system, or who are not covered by any system. As is indicated in Table 1, the percentage of wage and salary earners covered by social security rose from 87 percent to 90 percent over the period covered by the LEED file. The same table compares the total wage and salary figures reported in the national accounts by the Bureau of Economic Analysis (BEA) with the wage and salary figures derived from the LEED file. The LEED coverage gradually increased from 80 percent of the national accounts wage and salary earnings total in 1957 to 85 percent in 1969. This total is somewhat lower than the social security employment coverage, partly because of the processing procedures used in the creation of the LEED file. The Social Security Administration points out that it creates the LEED sample in September of the year

TABLE 1 Coverage of Social Security LEED File

	Percent of Total Employment			Wage and Salary Earnings		
	Total Reported to SSA	Not reported to SSA		BEA Total	LEED File	LEED as Percent of BEA
		Government	Other	(billion $)		
1957	87	8	5	237	189	80
1958	88	7	5	235	190	81
1959	88	7	5	253	204	81
1960	89	6	5	269	219	81
1961	89	6	5	271	223	82
1962	89	7	4	290	241	83
1963	89	7	4	305	252	83
1964	89	6	5	324	270	83
1965	89	6	5	347	285	82
1966	89	6	5	380	315	83
1967	90	7	3	412	347	84
1968	90	7	3	448	379	85
1969				492	417	85

SOURCE: Percentages of total employment:
"The 1% Sample Longitudinal Employee-Employer Data File," Social Security Administration, Office of Research and Statistics, Division of Statistics, Statistical Operations Branch, November 1971, page 3.
BEA wage and salary earnings:
1957–64 "The National Income and Product Accounts of the United States 1929–1965—Statistical Tables," Supplement to *The Survey of Current Business*, August 1966, Table 2.1, pages 34 and 35.
1965–67 *Survey of Current Business*, July 1969, Table 2.1, page 26.
1968–69 *Survey of Current Business*, July 1971, Table 2.1, page 26.
LEED wage and salary earnings:
Tabulated from LEED 1% file—summary figures multiplied by 100.

following the year to which the data refer, and that any items that are posted after this date are excluded. It is difficult to estimate the exact amount of undercoverage which results from this procedure, and it may differ considerably from year to year, but it is likely to be from 2 to 4 percent. Another source of difference may lie in the fact that the government employees who are not included in the LEED file have higher than average earnings.

From the point of view of year-to-year change, the earnings reflected in the LEED file track the national accounts wage and salary earnings very well. The gradual rise in the percentage of earnings covered from 80 to 85 percent in all probability reflects the combined effect of the increased number of people covered by the social security system and changes in the

timing of updating procedures. In terms of sampling reliability, the LEED 1 percent sample is of course quite large, starting with 515,000 cases in 1957 and rising to 700,000 cases in 1969.

SPECIFIC QUESTIONS TO BE INVESTIGATED

The LEED file provides a basis for investigating a wide variety of questions. In view of the lack of information on such things as hours worked, education, and family status, it is not possible to develop a full-fledged model of wages and labor force participation with the LEED material alone. Nevertheless, the LEED file is capable of providing new insights relating to certain specific aspects of earnings and labor force participation. This paper will confine itself to four sets of questions relating to specific variables. These are:

1. age-earnings profiles and birth cohort lifetime patterns of earnings;
2. sex and race differentials in both age-earnings profiles and birth cohort patterns of earnings;
3. work history at different points in the life cycle for different sexes and races; and
4. the distribution of earnings by size for different age-race-sex groups, its change over time, and the effect of changes in the level of economic activity and in prices on the distribution of earnings and labor force participation.

AGE

Age-earnings profiles have been the focus of considerable interest by economists. It has long been recognized that earnings rise with age up to a point, and then level off and decline. This phenomenon underlies many of the human-capital models which attempt to explain the observed differentials in terms of human investment by both the wage earner and the employer. The most comprehensive and reliable age profiles available up to now have come from the Census records, although even small samples do reveal the general patterns in broad outline. What has been lacking is an understanding of how the age-earnings profiles shift from year to year as the age composition of the population changes and as the level of economic activity and prices change, and as long-run economic growth takes place. Since the LEED file is available yearly for the period 1957 to 1969, it can be used to ask how age-earnings profiles do shift over

time, and whether these shifts are sensitive to differing sizes of entering cohorts and different economic conditions.

A second question with respect to age is how earnings change from the point of view of birth cohorts, rather than from the perspective of age-earnings profiles. In recent years, the topic of lifetime earnings of specific birth cohorts has aroused increasing interest because of the realization that individuals are, in fact, treated quite differently at different points in the life cycle, receiving different levels of income and having different financial responsibilities. The LEED file is particularly well suited to analyze the pattern of earnings for a twelve-year segment of the lives of individual cohorts, and to discover whether there is a significant difference in these lifetime patterns. There is a real need to link the analysis of shifts in age-earnings profiles over time with the relative behavior of different birth cohorts over time. These two questions are in fact different aspects of the more central question of the relation of age to earnings.

SEX AND RACE

Questions relating to sex and race differentials have also been central to the analysis of earnings and labor force participation. There have been many studies of such differentials, some of which have attempted to assess the extent of discrimination, defined in terms of differences in earnings of individuals with similar qualifications in the same occupation but with different race and sex characteristics. This sort of analysis is outside the scope of the present study. The sex-race differentials which are observed in the LEED file may result from a large variety of factors, including differences in occupation, education, labor force participation, and discrimination, and it is not possible to isolate the different factors. It is important, however, to recognize that, whatever their roots, there are major sex and race differentials, which result in different amounts of earnings for different individuals. With the LEED data, it is possible to ask how age-earnings profiles differ for the different sex and race groups, and how these profiles have shifted over the period from 1957 to 1969. The answer to these questions can throw considerable light on whether or not the gross differentials between sex and race groups are, in fact, being systematically reduced by increased educational opportunities and a reduction in discrimination. In this connection, it is also possible to trace out the lifetime earnings patterns of different birth cohorts for individual race and sex groups, to ascertain whether there are characteristic differences in the shapes of these functions, and whether generalizations

can be made about such patterns in terms of the nature of the groups involved.

WORK HISTORY

There are a number of questions relating to work history that can be answered by the data in the LEED file. For example, it is useful to ask how the different sex and race groups enter and exit from employment over their life cycle. Men traditionally enter the labor force in their teens or early twenties, and leave it only through death or retirement. Women, on the other hand, may leave the labor force during the childbearing years, and then may or may not reenter it. Detailed evidence on the age pattern of entrance and exit based on a large sample has not been readily available. The LEED data can cast considerable light upon the nature of this pattern for both white and nonwhite females.

There are also other questions relating to work history to which the LEED data can provide answers. For each individual, it can be ascertained whether he is working at all in a given quarter, and whether his employer is the same or different from the one reported in some other specific period. Thus, a work history can be developed which reflects exits from and entrants to employment from one year to the next, and shows as separate groups those individuals who retain the same employer and those who change employers. The question of exits and entrants is highly related to employment turnover or instability, and to the pattern of younger people coming into the labor force and older people leaving it. Differences in age, race, and sex patterns throw light on questions of labor force participation by different groups at different stages in their life cycles. For instance, is it true that it is the tendency for labor force entrants to come in at a low wage and for those who exit to leave at a high wage that makes possible increases in wages to all workers without a corresponding increase in the total wage bill? Although hours worked are not available in the LEED file, it is possible to see whether an individual's total earnings increased or decreased from one period to the next. Such increases and decreases will, of course, reflect changes in both wage rates and hours worked. Moving from part-time to full-time work may result in very large increases in earnings, and from full time to part time will result in large decreases. Changes in overtime work may also have a major impact on the change in earnings. Changes in wage rates should, in general, result in increases in earnings rather than decreases, but on the average, such increases would not be expected to be large. Examination of the increases and decreases in earnings for individuals with unchanged

employers can, therefore, cast some light on the question of how important changes in labor force participation are for individuals who remain employed. Such questions are central to analyzing why the wage bill changes as it does under different economic conditions.

DISTRIBUTION OF EARNINGS BY SIZE

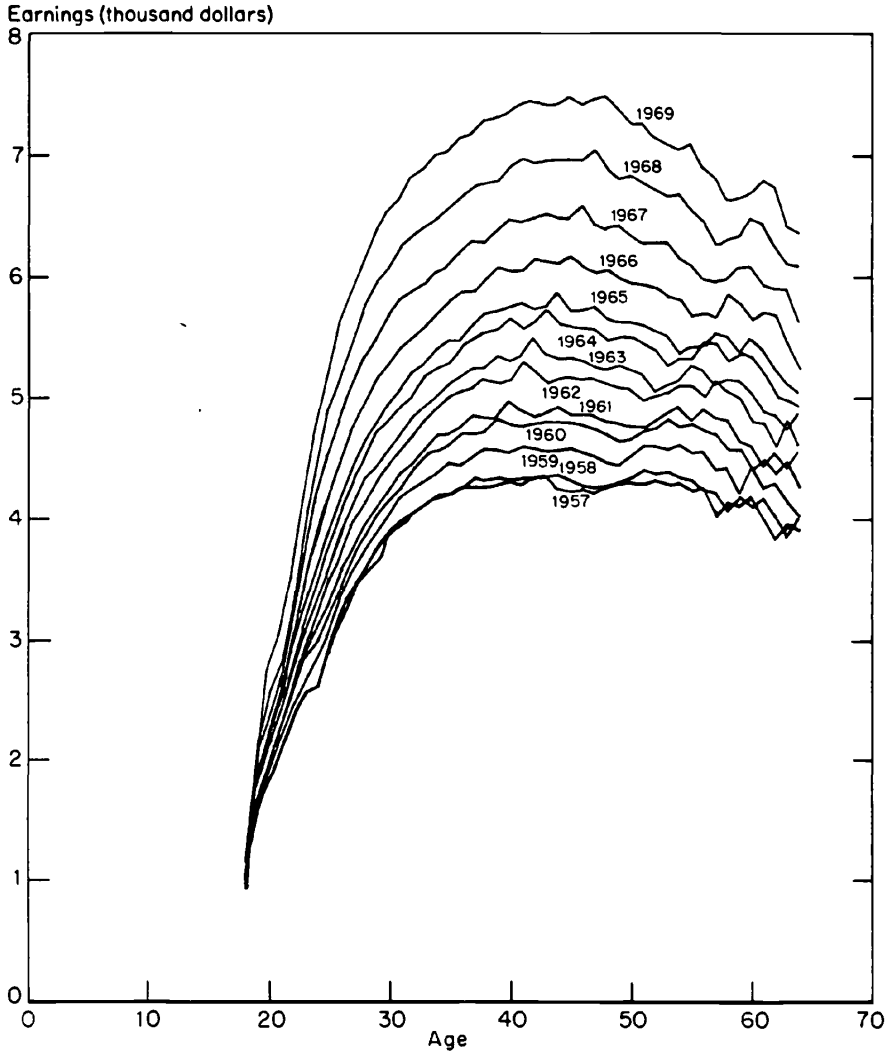
The distribution of average annual earnings by size is, of course, directly related to the question of earnings differentials according to age-sex-race groups. Specifically, it may be asked whether the observed higher male wages come about through a greater variance in the size distribution of their income. In other words, does the male distribution include low- as well as high-income earners, or is the whole range of male earnings higher? Does the size distribution of earnings become more unequal with advancing age, and is this true for all sex and race groups?

Finally, does the size distribution of income differ significantly over time, and at different levels of economic activity? This final set of questions relates to the effects of changes in the level of economic activity and the price level upon earnings and labor force participation. The questions which will be asked relate to who benefits and who loses in periods of slow growth and small wage increases, compared with periods of higher growth and larger wage increases. In all periods, some individuals gain and others lose. The question which is being asked here relates to differences in the number of people who gain and lose, and the differential effects on different age, sex, and race groups. Only by such analysis, expressed in real terms, can the loss or gain resulting from tightening down or speeding up economic activity be assessed.

AGE AND EARNINGS

Age-earnings profiles for the period 1957–69 can be derived from the LEED file by single years of age. These are shown in Figure 1. The successive age-earnings profiles for the different years shift upward, the lowest representing the year 1957, and the highest the year 1969. From this chart it becomes apparent that the shift from year to year is highly dependent upon economic conditions. The year 1958, for example, shows no significant upward shift over the year 1957; in fact the two age-earnings profiles overlap. Similarly, in the mild recession of 1961 the age-earnings profile also failed to shift upward significantly. In contrast,

FIGURE 1 Age-Earnings Profiles, 1957–69 (Current dollars)



in each year from 1966 through 1969 there was a strong upward shift in the profile reflecting a sharp rise in earnings for all age levels.

From Figure 1, it would appear that the profile is considerably less flat in the ages from 35 to 60 in more recent years than it was in 1957. In other words, those in the middle age groups would appear to have gained relatively more than those either younger or older. The age-earnings

profiles shown in Figure 1 are, however, not completely smooth and regular. Inasmuch as they are based on a very large sample, the irregularities deserve consideration. Thus, for example, the profile for 1969 shows a sharp dip in earnings for those of age 58, born in 1911, relative to those immediately older or younger. This dip can in fact be traced back for this birth cohort in the profiles for previous years, suggesting that for some reason this cohort was retarded relative to those around it. This was the birth cohort which entered the labor force in approximately 1930, and it is not unreasonable to assume that the labor market conditions at the time of their entry had a significant depressing effect on their earnings, relative to those who preceded them and were already established in the labor market. In contrast, the cohort who were born a decade later and came into the labor market in 1940 are high relative to the cohorts surrounding them and seem to have enjoyed this advantage continuously. Especially sharp peaks for this birth cohort can be seen in the profiles for the period 1961 to 1965.

The average earnings shown in Figure 1 are in terms of current year prices, and to the extent that consumer prices were rising the chart overstates the upward shift of age-earnings profiles in real terms. In Figure 1A average earnings of each year are deflated by the consumer price index, using 1957 as a base. The successive annual profiles in Figure 1A are much closer together than those in Figure 1, indicating that a substantial part of the observed earnings increases from 1957 to 1969 did not reflect increases in real earnings. It is interesting to note that in real terms the age-earnings profile for the year 1958 is lower than that for 1957, indicating that even the employed workers in the 1958 recession suffered a real decline in income.

The earnings patterns for all birth cohorts born in the period from 1904 to 1941 are shown in Figure 2. Each line in this diagram shows the average earnings over the period 1957–69 for a single-year birth cohort. The points plotted in this figure are of course the same as those in Figure 1. In Figure 1, however, the points for all ages in a given year are connected, yielding a cross-section picture. In Figure 2, points for a given birth cohort for all years are connected, thus tracing out the experience of given groups through time. The relation between Figure 1 and Figure 2 can be easily seen if one considers that the age profile shown for the year 1969 can be obtained by connecting the end points of the birth cohort earning patterns.

In Figure 2, the lack of change in earnings from 1957 to 1958 appears as a sideways movement in earnings patterns; this same sideways movement is exhibited again for the period 1960 to 1961. The ripples in the earnings pattern lines indicate slackening in the rate of increase of earnings due to slowing down of economic activity. The earnings patterns

for the cohorts born in 1911 and 1921 are labeled explicitly on Figure 2; as can be seen, these are the cohorts which respectively lagged behind and led adjacent cohorts, and appeared as dips and peaks in Figure 1.

If the age cohort earnings patterns are deflated by the consumer price index, the individual age cohort earnings patterns rise much more slowly, and the difference in the rate of increase with age becomes more apparent. This is shown in Figure 2A. From 1957 to 1958, the earnings of all cohorts 35 years old and over declined. Less drastic slowdowns in the increase in earnings can be seen for a number of other years.

FIGURE 1A Age-Earnings Profiles, 1957–69 (1957 dollars)

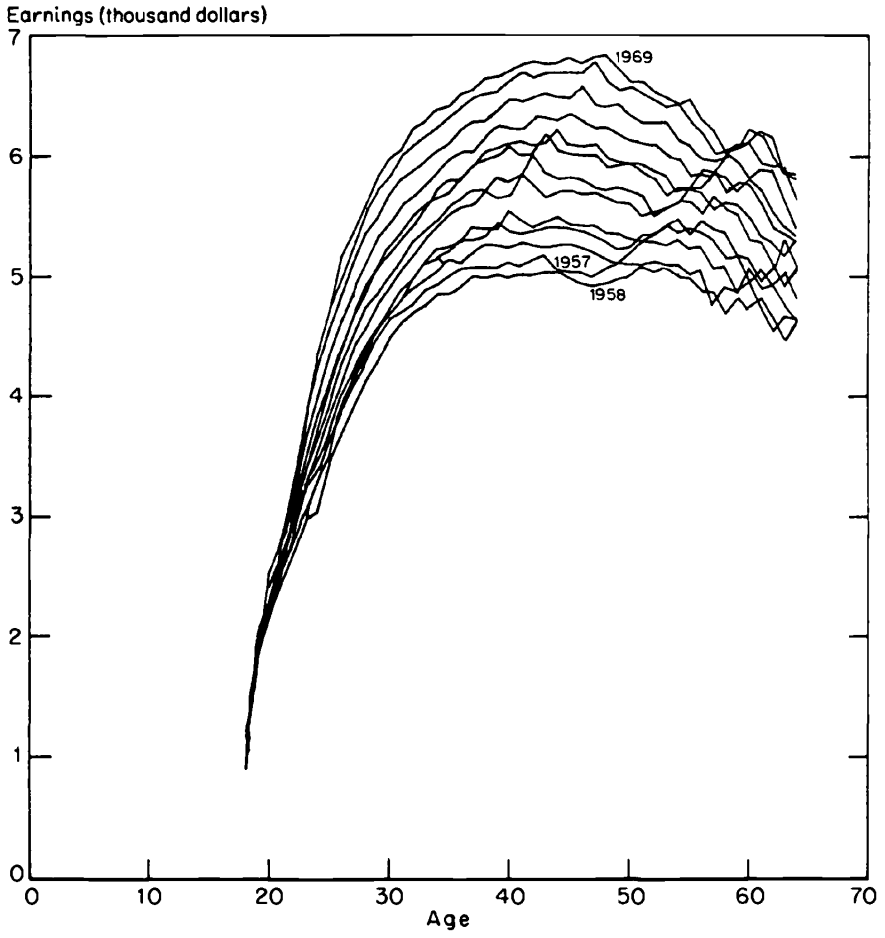


FIGURE 2 Age-Cohort Earnings, 1957–69 (Current dollars)

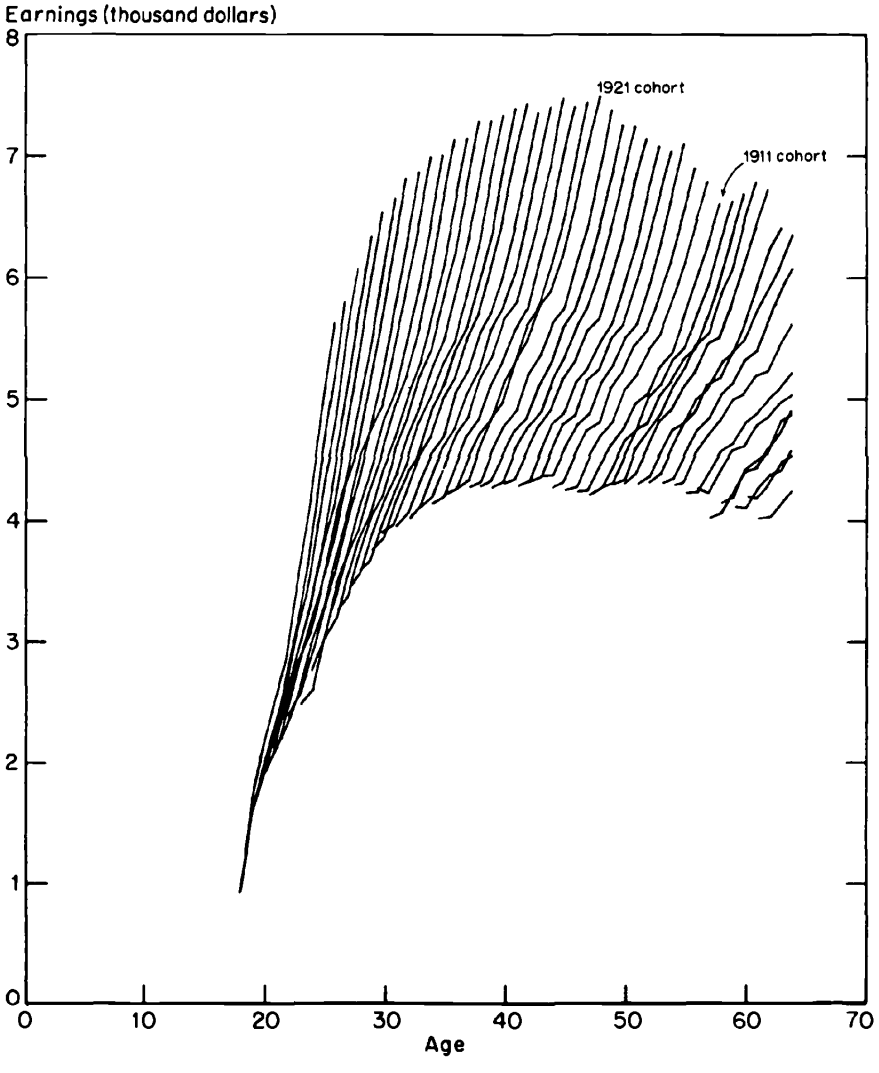
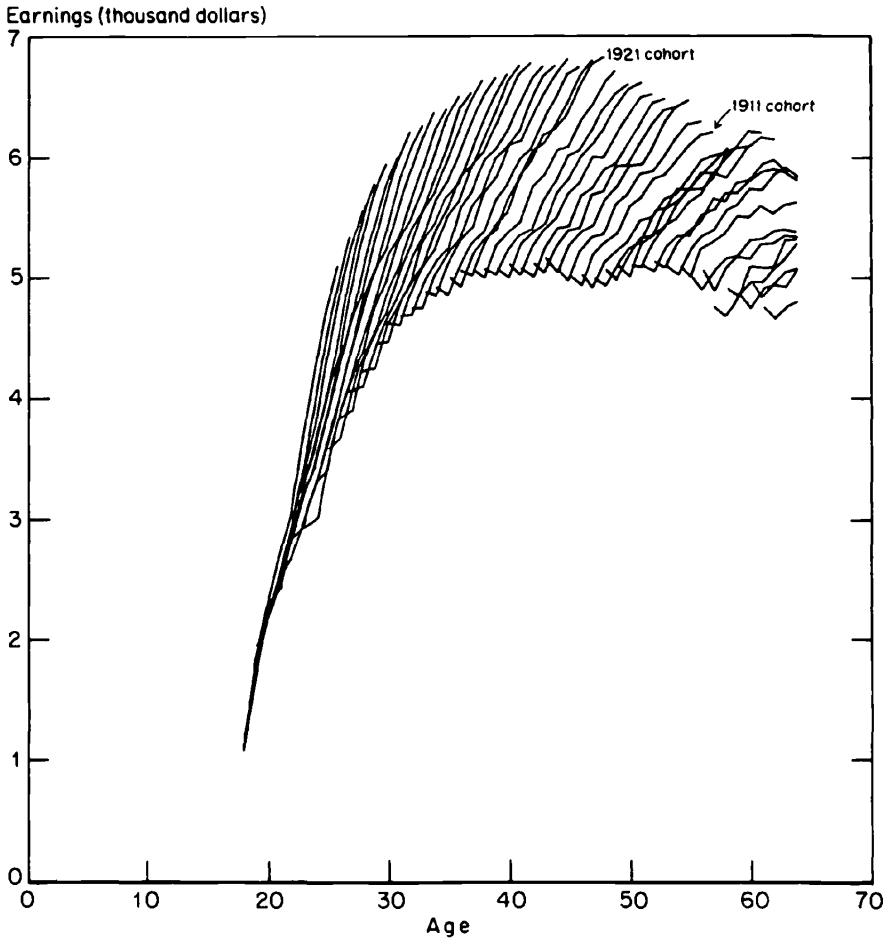
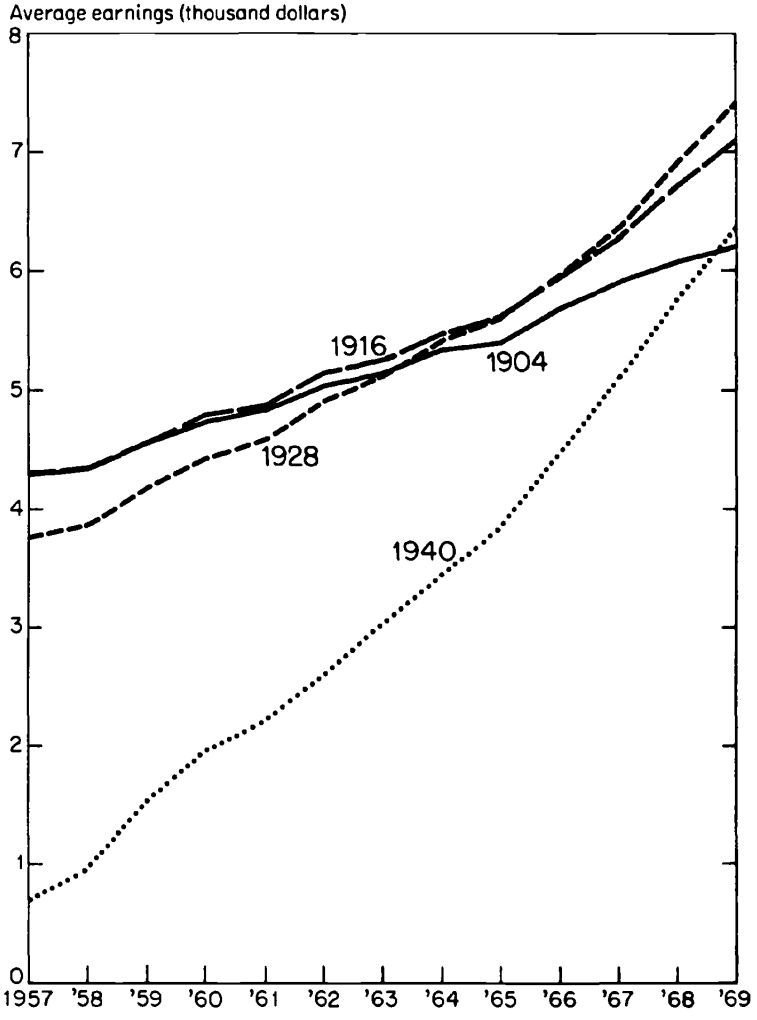


FIGURE 2A Age-Cohort Earnings, 1957–69 (1957 dollars)



The interrelation of the earnings patterns of different birth cohorts can be seen more easily when they are plotted by calendar year, rather than age. Figure 3 shows the earnings patterns for people who were born in 1940, 1928, 1916, and 1904. At the beginning of the period, these people were aged 17, 29, 41, and 53. By the end of the period, they were 29, 41, 53, and 65. In 1957, the average earnings of the 1904 and 1916 cohorts

FIGURE 3 Earnings Patterns of Four Birth Cohorts, 1957–69 (Current dollars)



were almost identical, and they exhibited the same pattern of growth for the next two years. After that, however, the 1904 cohort rose somewhat more slowly, and in 1963, when its members were 59 years old, its earnings were equaled by those of the faster-rising 35 year olds of the 1928 cohort. This 1928 cohort was also increasing faster than the 1916 cohort, and caught up with the latter by 1965, going on to be the top in average earnings from then on. The 1940 cohort, which of course started out the lowest of all in 1957 when they were 17 years old, increased rapidly throughout the period, catching up with the 1904 cohort in 1968 when they were 28 and those in the older group were 64. The striking point of Figure 3 is that younger cohorts successively overtake older cohorts, and in turn are themselves overtaken by still younger cohorts. The variance which existed among cohorts when they were at ages ranging from 17 to 53 became considerably reduced when they all advanced to the age range 29–65.

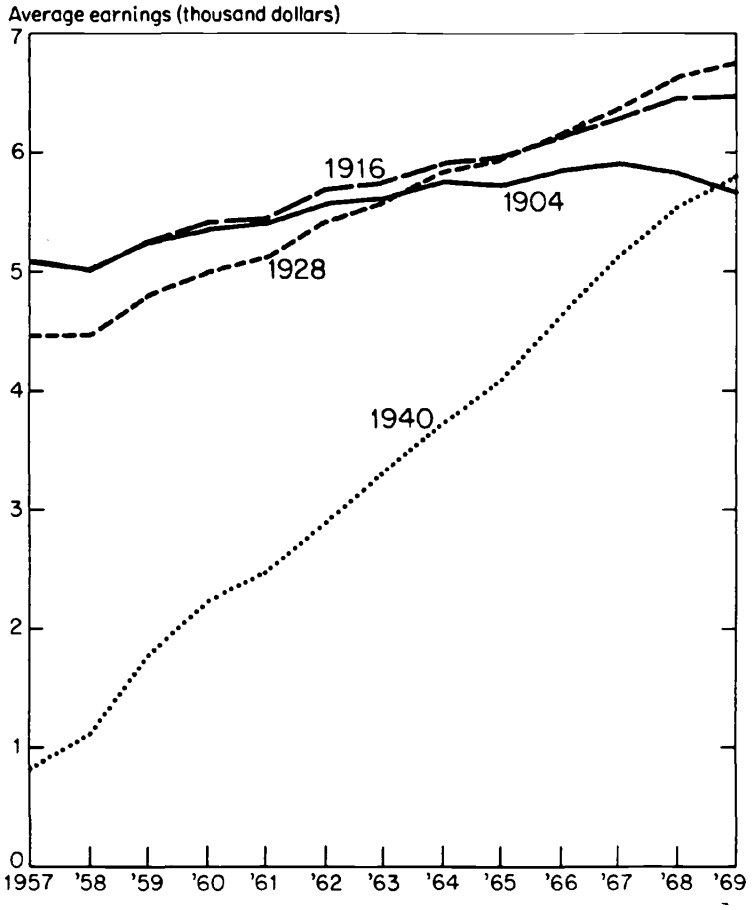
In relating the age-earnings profiles to the earning patterns of specific birth cohorts, the leveling off and decline in average earnings shown by the cross-sectional age-earnings profile is in marked contrast with the continual rise in earnings exhibited by every birth cohort up to the point of retirement at age 65. The shape of the age-earnings profile results from the differential rates of earnings increase at different points in the life cycle. The effect of economic conditions appears in a substantially reduced rate of earnings increase for all birth cohorts in periods of recession and unemployment, but substantial increases in output and employment do not appear to have as much influence.

If the earning patterns of specific birth cohorts are measured in real terms (as shown in Figure 3A), the rate of increase for all of the cohorts is substantially reduced, and for the oldest cohort (those born in 1904) an actual decline in real earnings takes place in the last several years, i.e., after age 65. No significant real decline takes place prior to that age, however, except in periods of recession.

SEX AND RACE DIFFERENTIALS

The discussion of age-earnings profiles and birth cohort earnings patterns to this point has treated the population as a whole, without respect to either sex or race. It is well known, however, that significant sex and race differences do exist. The differences in age-earnings profiles are striking. Figure 4 shows the age-earnings profiles by race and sex for the year 1969; this figure is a decomposition of the total age-earnings profile shown in Figure 1. For white males, the peak average earnings in 1969

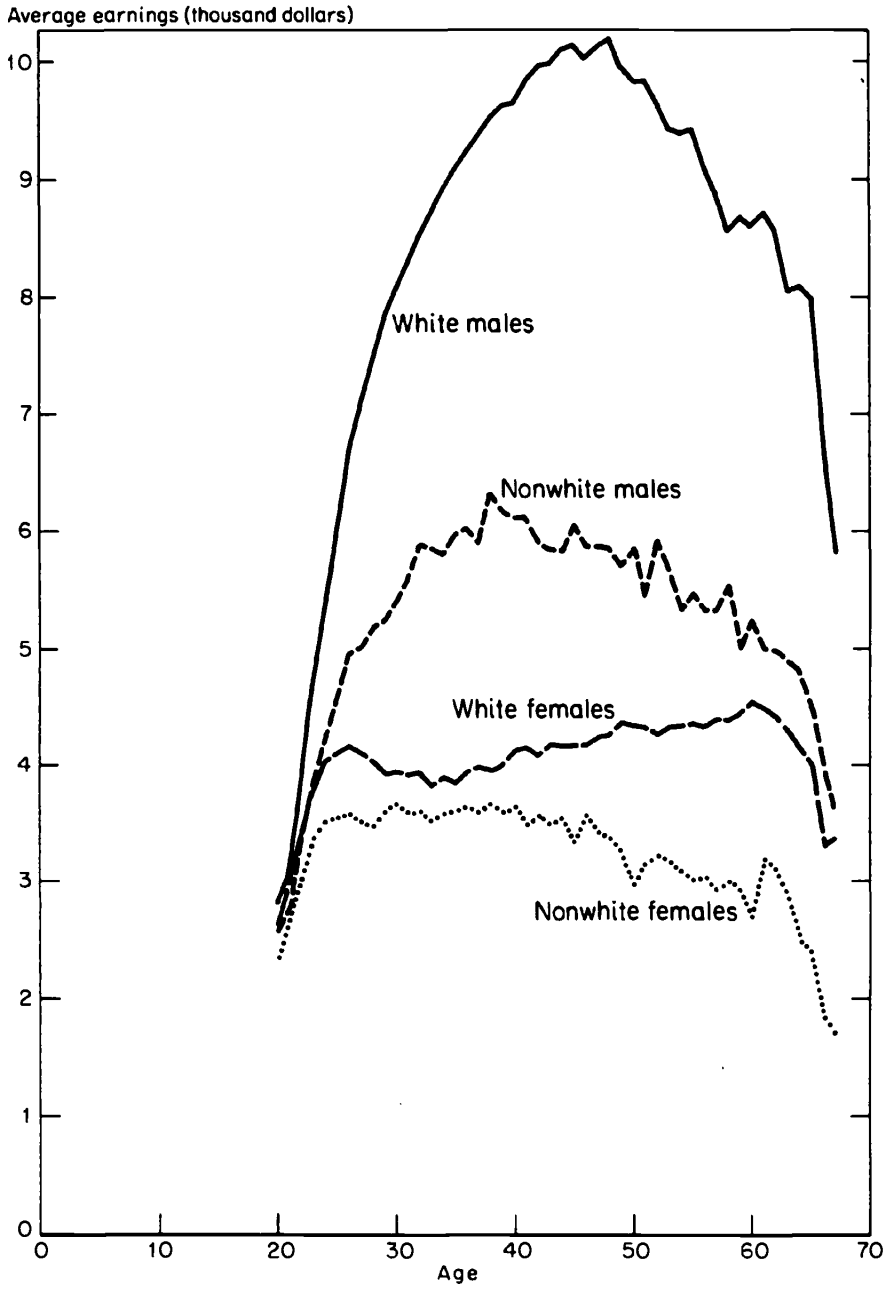
FIGURE 3A Earnings Patterns of Four Birth Cohorts, 1957–69 (1957 dollars)



were received by those in the late forties, and substantial differentials existed over the ages from 30 to 65. For nonwhite males, the highest income was received in 1969 by those in their late thirties. Although the level of nonwhite male earnings is lower than that for white males, the general shape of the age profile is quite similar. For all ages and both races, male earnings are substantially greater than female.

Besides being substantially below that for both groups of males, the age-earnings profile for white females is very different in shape. After an

FIGURE 4 Age-Earnings Profiles by Race and Sex, 1969



initial rise up to the mid-twenties, the age-earnings profile drops until the mid-thirties, after which time there is a gradual rise to age 60. This pattern is undoubtedly influenced by the withdrawal of women during the childbearing ages. There appears to be a mix effect in which the net exit of women with higher incomes is greater than the net exit of women with lower incomes. Table 2 illustrates this pattern for white women aged 24.

TABLE 2 Number of White Women Aged 24 in Social Security Covered Employment by Income Class

Income Group	Number 1963	Exits 1963	Entrants 1964	Percent Net Change
$ 1–999	585	292	261	−5.3
1,000–1,999	535	194	156	−7.1
2,000–2,999	814	206	139	−8.2
3,000–3,999	932	204	105	−10.6
4,000–4,999	730	129	55	−10.1
5,000–5,999	275	48	21	−9.8
6,000–6,999	82	10	6	−4.9
7,000–7,999	20	6	1	−25.0
8,000 and over	4	0	0	0
Total	3,979	1,089	744	−8.7

SOURCE: Based on detailed tabulations of Appendix Table A-3.

It should be pointed out that this decline in the age-earnings profile of white females does not mean that there is a corresponding decline in the lifetime patterns of birth cohorts passing through these age groups. During the year 1963 more than 27 percent of the women 24 years old exited from employment, while only 18 percent of the women employed in the first quarter of 1964 had not been employed in the first quarter of 1963. Thus, of women who were 24 years old in 1963, the number employed declined by approximately 9 percent from 1963 to 1964. As Table 2 shows, this decline was sharper for women in higher earnings groups than for those in lower earnings groups. It seems reasonable that this effect may be due to the higher family-income status of women who are themselves receiving higher earnings. The decision to leave employment because of childbearing is probably related to the level of income enjoyed by the family. Women in low-income families who themselves are receiving low incomes cannot afford to stop working.

For nonwhite females, the ages of highest income are between 30 and 40, a range over which there is no appreciable difference. After that, as in the case of nonwhite males, the earnings for older age groups are lower. It should be pointed out that the age-earnings profiles reflect the influence of historical changes on lifetime patterns. It is doubtless true that the occupations and industries in which the different sex and race groups are employed have different lifetime patterns. It is also true, however, that in recent years these occupations and industries have been changing, especially for the younger age groups, which suggests that the age profiles can be expected to change in shape in the future.

A comparison of the percentage change in average earnings by sex and race over the period 1957–69 for specific age groups is shown in Table 3.

TABLE 3 Percent Change in Average Earnings by Age, Sex, and Race, 1957–69

Age	White Male	White Female	Nonwhite Male	Nonwhite Female
20–24	54	52	77	106
25–29	75	66	90	124
30–34	74	59	92	110
35–39	76	59	92	109
40–44	80	67	90	107
45–49	84	64	92	108
50–54	76	64	99	98
55–59	71	72	79	105
60–64	69	86	83	130
Average	73	67	86	107

SOURCE: Based on Appendix Table A-1.

This table provides a measure of the extent to which gross differentials among the various groups have changed. The most striking feature of this table is the relative improvement in the position of nonwhite females. They averaged an increase of 107 percent over the period 1957–69, and in almost every age group exceeded the increases shown for other groups. In contrast, the position of white females improved the least. Overall, their earnings rose by only 67 percent. From age 55 onward, however, white females did better than white males, and after 60 even better than nonwhite males. Nonwhite males did better than white males at all ages,

increasing by over 90 percent between the ages of 25 and 54. In general, then, the gross differentials by race narrowed in the period 1957–69 for all age groups, with black women making the largest relative gains. White females, however, dropped behind; the gross differential between them and white males increased for all ages up to 55.

The earnings patterns for specific birth cohorts can also be broken down by race and sex. This is done in Figures 5 and 5A. The four sections of these figures represent a disaggregation by race and sex of the earnings patterns for birth cohorts shown in Figures 3 and 3A. It is apparent that the sex and race differentials in earnings patterns are established in the early years; as the 1940 birth cohort shows, well before age 29. White female earnings are on a par with those of white males up to age 22, after which time the earnings of white males increase much faster than those of white females; the latter are surpassed by nonwhite males by the age of 26. The rate of increase of white and nonwhite females over the period as a whole was remarkably similar. The patterns for all race and sex groups in the older cohorts reveal the expected slowing in the rates of increase, but again it is striking that no birth cohort for any race or sex suffers a decline in earnings over any part of its life cycle, and the relative positions of the different sex and race groups are essentially maintained throughout.

In this connection, it may be noted from Figure 5A that the average real earnings of older nonwhite males do drop significantly in periods of mild recession. Thus, in the three older birth cohorts there is a substantial decline in both 1958 and 1961 for this group. For white males, there was a decline in real earnings for the oldest cohort in 1958, but for females the earnings patterns are relatively undisturbed by the recessions.

WORK HISTORY

Individuals' employment history varies considerably over their lifetimes. The LEED file cannot capture the complete pattern in all of its detail; it does not include the self-employed, many of the employees of state and local governments, most federal employees, railroad employees, and those employed in some other small uncovered occupations. Nevertheless, as was indicated in Table 1, the coverage is quite high, so that an analysis of the work history of specific birth cohorts does provide information on the lifetime pattern of employment.

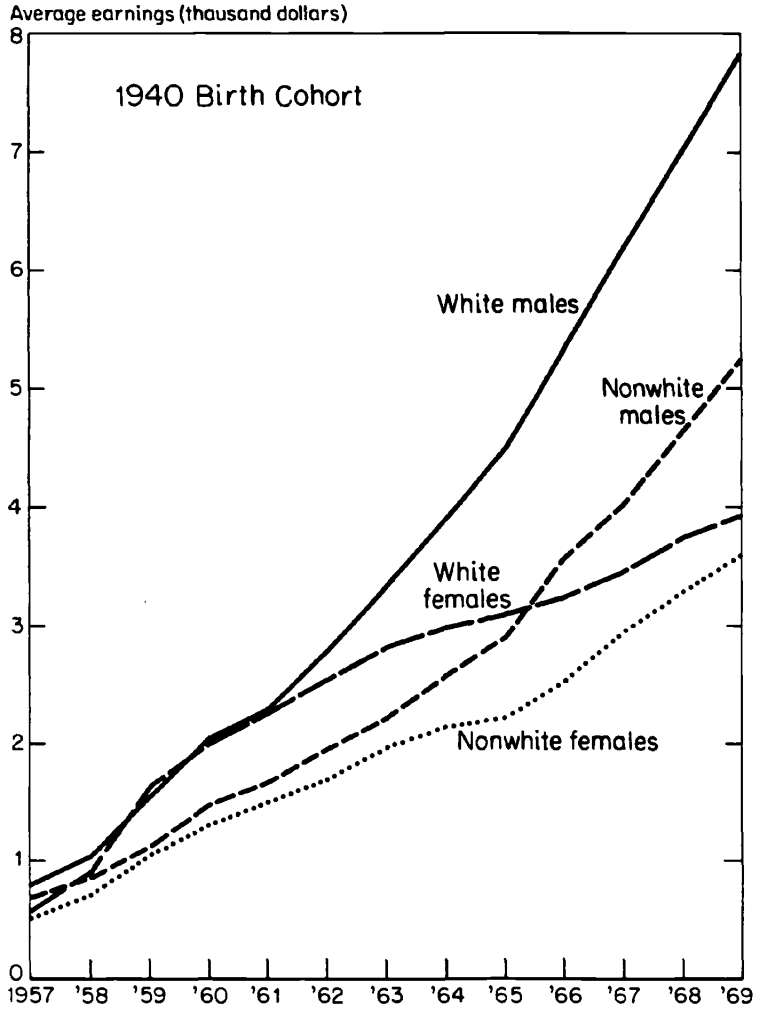
Determination of the size of the birth cohort raises certain problems. Actual birth data are not suitable, because of the mortality, immigration, and emigration which take place prior to the age of legitimate employ-

ment. Census data are more appropriate, but for younger age groups they suffer from substantial underreporting. In the 1970 Census, for example, it is estimated that total underreporting was of the order of 2.5 percent, i.e., 5 million persons, and it is generally conceded that the most serious underreporting occurs in the highly mobile groups—the young, the male, the nonwhite. For instance, the number of 20-year-old nonwhite males reported in the 1960 Census was 23 percent below the number of 30-year-old nonwhite males reported in the 1970 Census. Understatement on a somewhat smaller scale also exists in the 1960 Census for young whites (12 percent for males, 9 percent for females), but for older age groups the discrepancy between the 1960 and 1970 censuses is in line with expected mortality. Although it would be possible to adjust the birth cohort size to reflect mortality, it is perhaps more useful to treat it as a form of withdrawal from employment, somewhat analogous to permanent retirement.

The expected lifetime employment pattern for males is one in which the percentage employed increases during the initial years due to individuals entering the labor force for the first time, levels off in the adult years, declines somewhat due to mortality in the middle and later years, and declines sharply at the point of retirement. For females, childbearing can be expected to have a significant impact on the lifetime employment pattern. Figure 6 presents the observed lifetime employment patterns for four different birth cohorts. These cohorts have been selected so that, taken all together, they cover the ages from 17 through 65. The pattern within a cohort reflects the actual experience of that cohort in the years from 1957 to 1969.

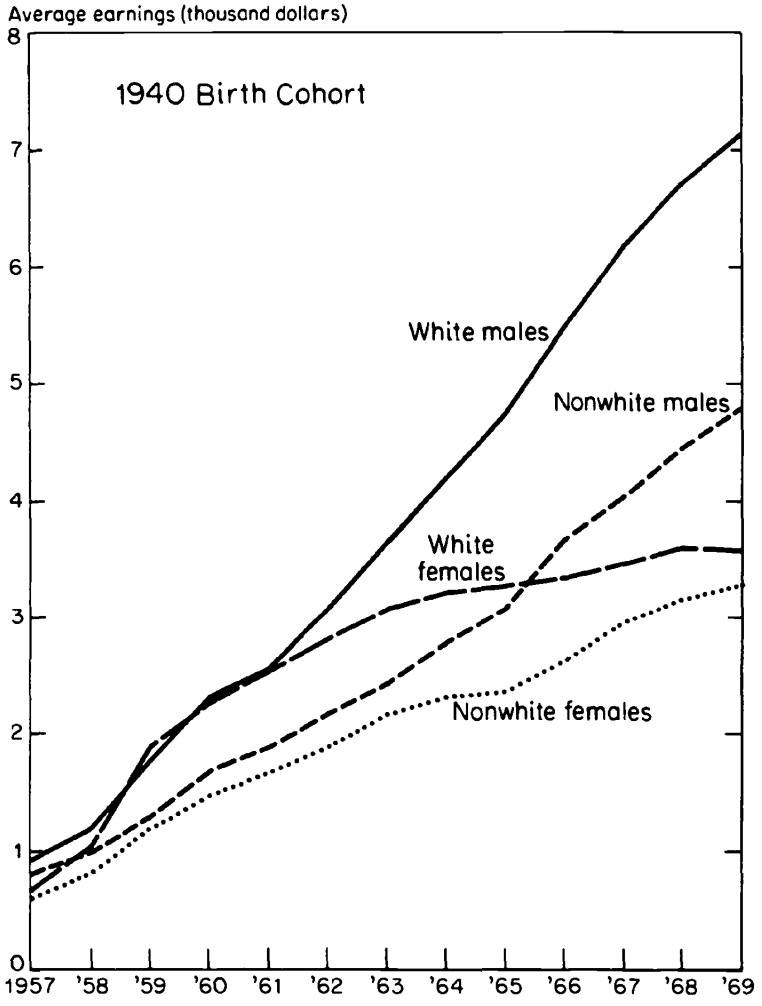
For males, the expected pattern does emerge. The break between the 1940 and 1928 cohorts may be due in large part to Census understatement of the size of the younger population cohort. If the cohort is, in fact, larger than shown in the Census, the percentage of this cohort employed in covered occupations would be correspondingly lower, and would be more in line with the 1928 cohort. It is, of course, quite legitimate for employment percentages for these two cohorts to be different at the point of the break, since one represents the situation for 29-year-olds in 1969, whereas the other represents 29-year-olds in 1957. In the experience of the 1928 birth cohort, it can be seen that the employment of nonwhite males dropped in the recession of 1958, but rose substantially above that of white males in the subsequent prosperity of the late 1960s. The striking feature of the 1916 and 1904 birth cohorts is the substantial decline in the percentage employed, similar for both nonwhite and white males. The decline starts in the early forties, and increases thereafter, until at the conventional retirement age of 65 only about a quarter of the cohort is still employed in covered occupations.

FIGURE 5 Earnings Patterns by Race and Sex for Selected Birth Cohorts, 1957–69: Section 1 (Current dollars)



For white females, the percentage employed declines from age 21 through age 28, reflecting withdrawals for raising families. Starting in the early thirties, the percentage employed increases continually to the mid-fifties. Only after that does the decline set in, and it is more gradual than that of males. During the childbearing ages, the percentage employed dropped from 46 percent to 27 percent. Since, in fact, the data

FIGURE 5A Earnings Patterns by Race and Sex for Selected Birth Cohorts, 1957–69: Section 1 (1957 dollars)



shown here pertain only to covered employment, the actual percentage employed probably exceeded this by at least another 6 or 7 percentage points. Thus, approximately three-fifths of the number of women initially employed are employed throughout this period. Although the higher percentage of women employed at the end of the 1940 birth cohort in comparison with the beginning of the 1928 birth cohort may be explained

FIGURE 5 (continued): Section 2

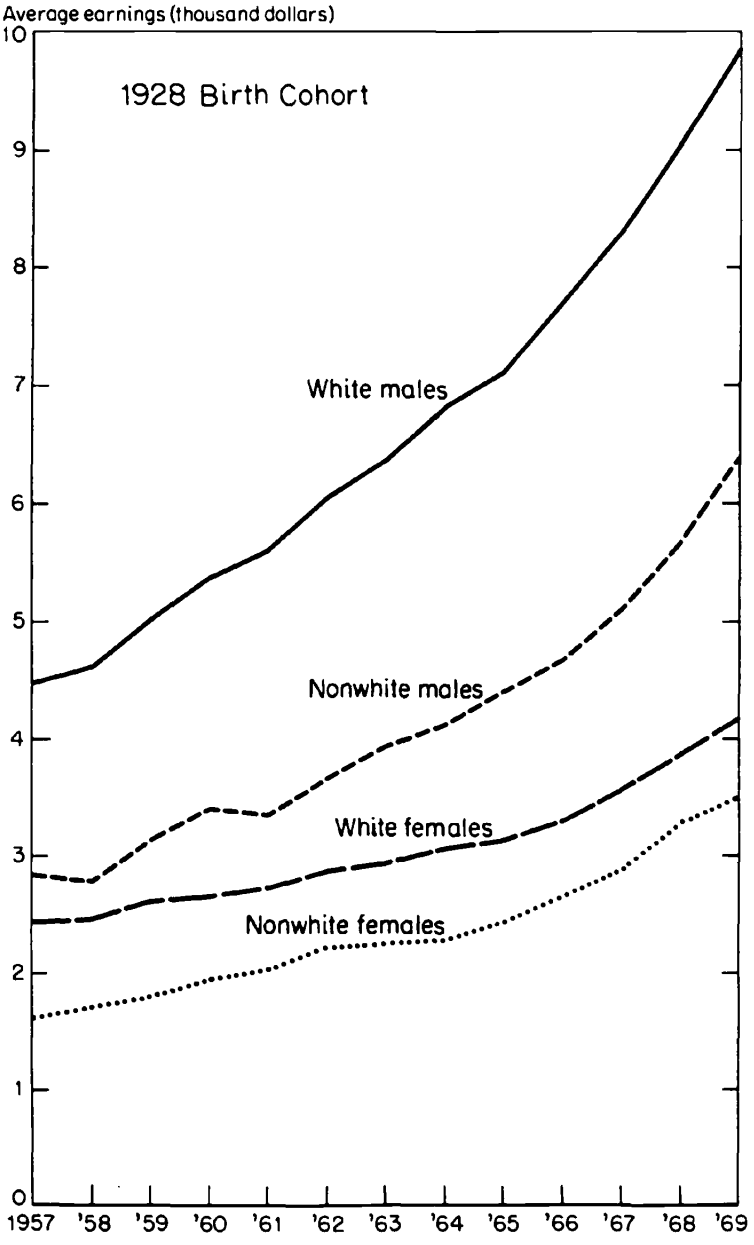
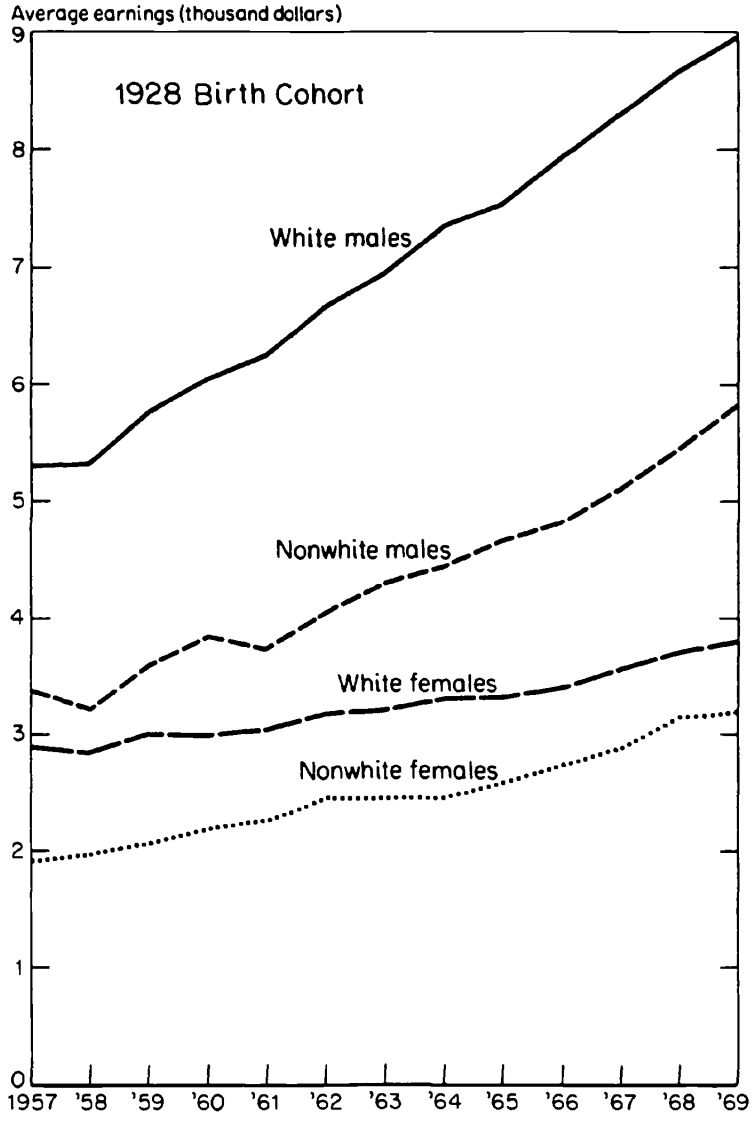


FIGURE 5A (*continued*): *Section 2*



in part by Census underenumeration, underenumeration is substantially less for women, and this same relation between cohorts can be observed between the other pairs of cohorts as well. This suggests that there is a successive increase in the percentage employed by each successive younger cohort.

FIGURE 5 (continued): Section 3

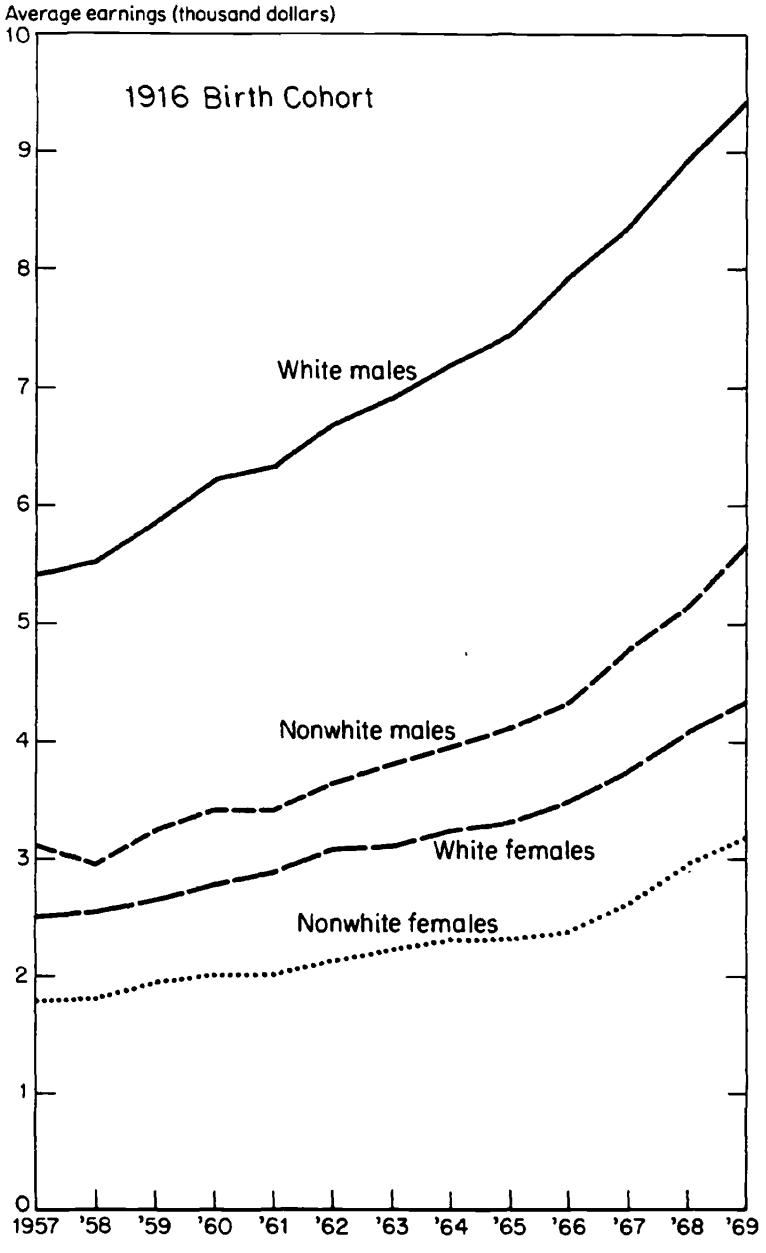
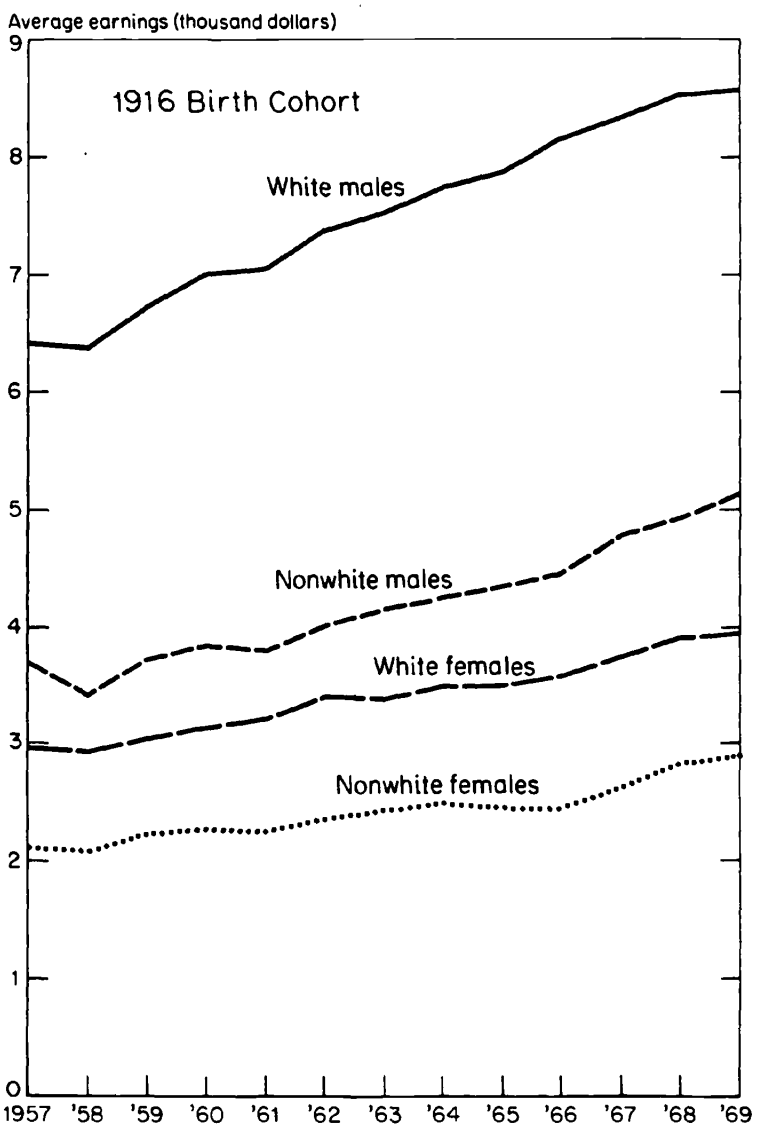
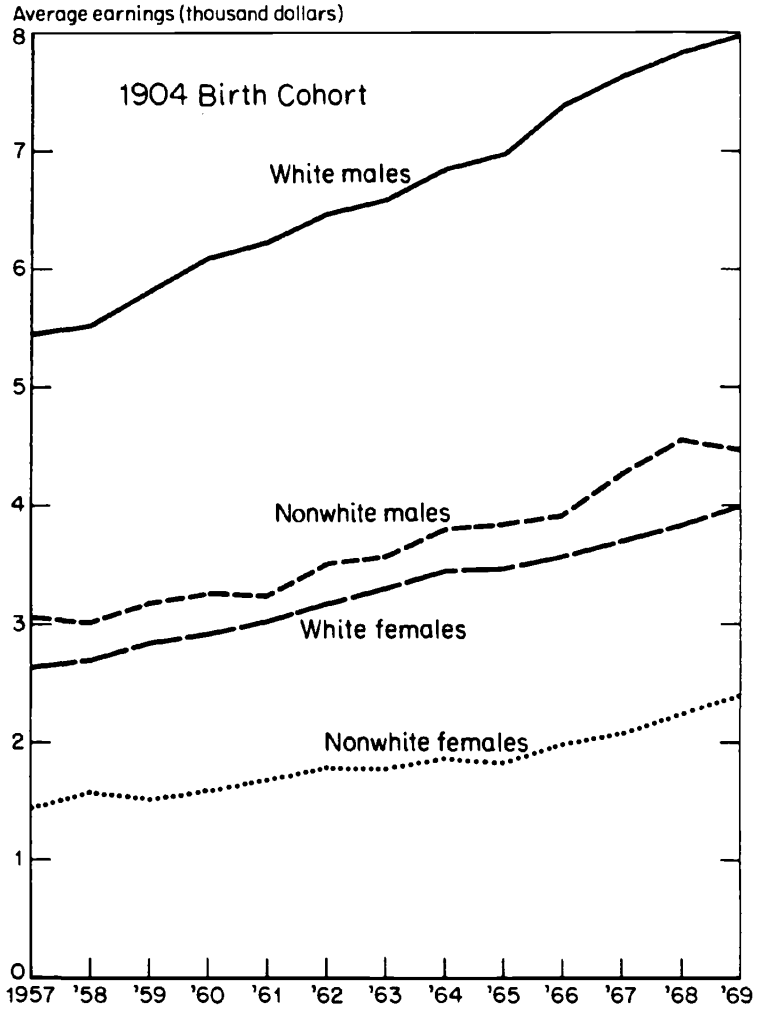


FIGURE 5A (continued): Section 3



Nonwhite women do not follow the pattern either of white women or of males. Their employment in the earlier years is substantially lower, but it increases steadily even during the childbearing ages. At age 25, it equals that of white women, and it continues to rise thereafter. As in the case of

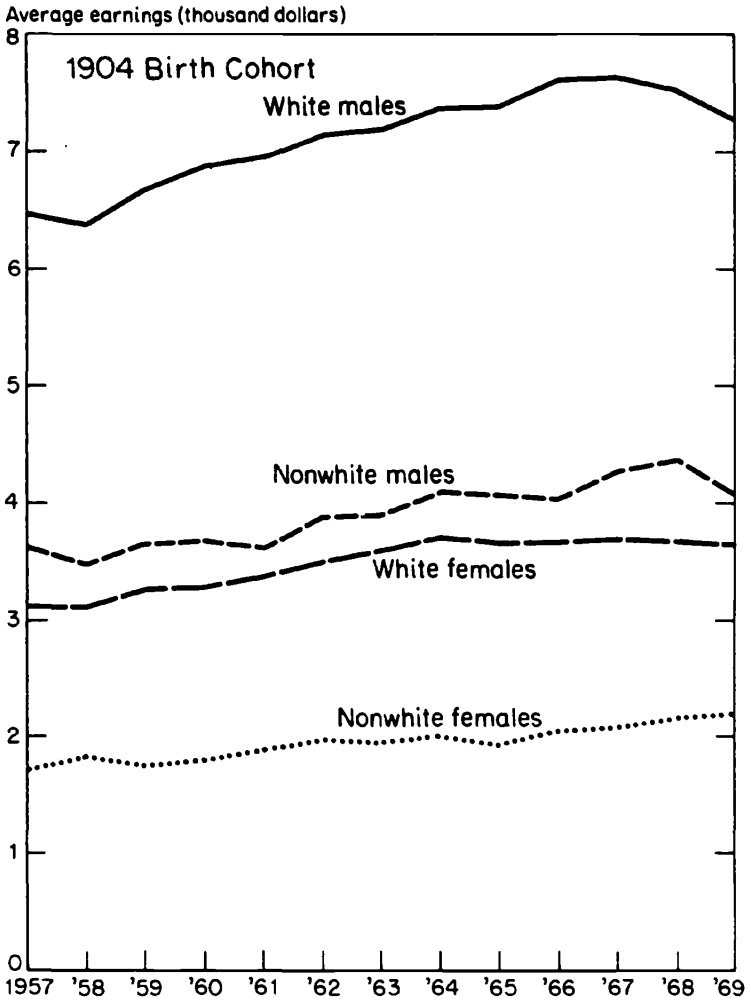
FIGURE 5 (concluded): Section 4



white women, this increase extends into the mid-fifties. In the oldest cohort, the employment of nonwhite women is almost identical with that of white women.

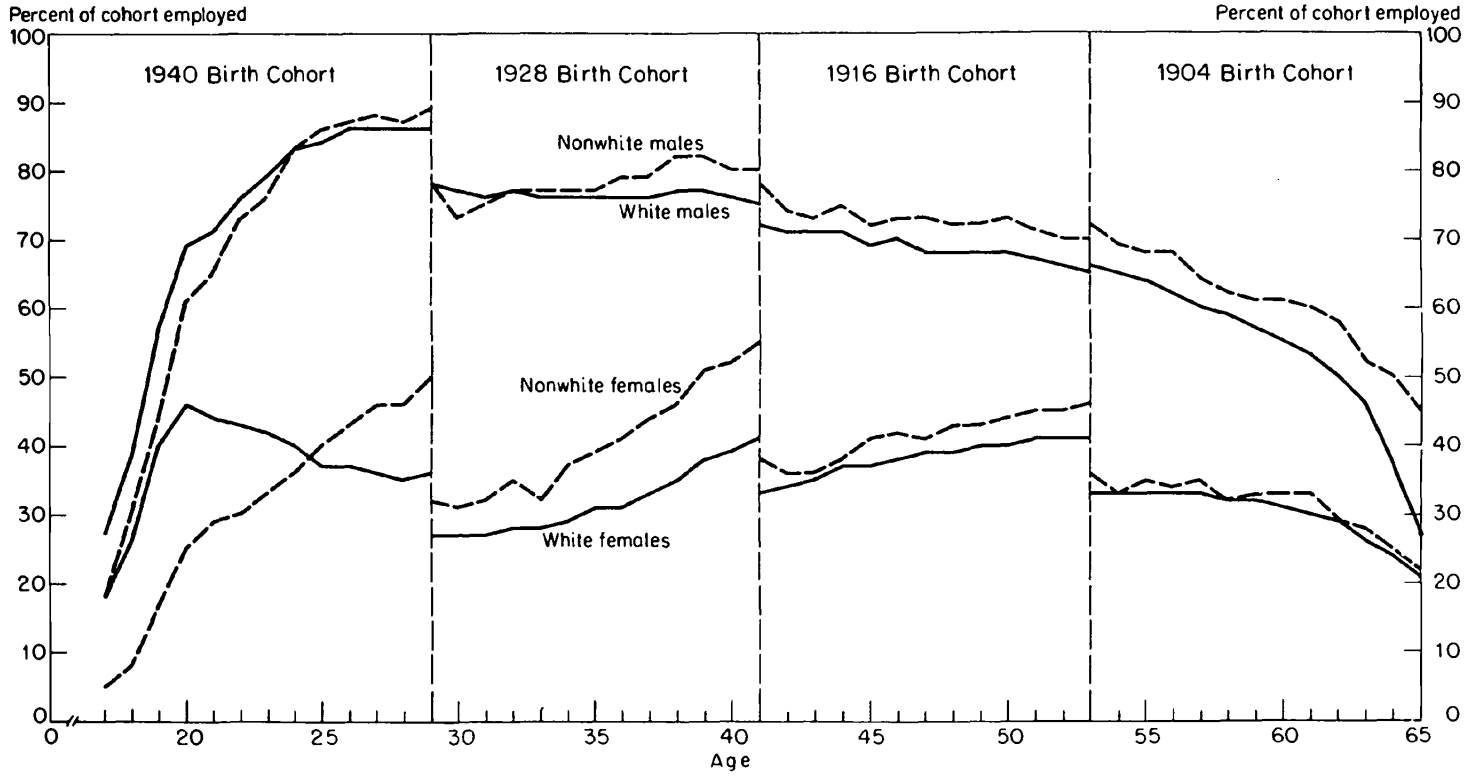
The percent-employed data, however, do not adequately reveal the year-to-year work-history changes. It is interesting to ask how people move in and out of employment in the various age groups, and to determine the relative importance of workers with single employers over time. Table 4 presents this information by race and sex for three age

FIGURE 5A (concluded): Section 4



groupings in 1957–58 and 1968–69. An exit, for the purposes of this table, is a person who was employed in the first quarter of the initial year, but for whom there is no record of employment in the first quarter of the following year. An entrant is a person for whom there is no record of employment in the first quarter of the initial year, but who is employed in the first quarter of the following year. Persons having unchanged single employers in both years can also be identified, since the establishment identification number is given in the social security records. It should be

FIGURE 6 Percent of Cohort Employed by Race and Sex for Selected Birth Cohorts, 1957–69



borne in mind that the observations relate to a period of one quarter, and the absence of an employer report signifies that an individual was not employed in social-security–covered employment at any time during the quarter. On the other hand, the presence of an employer report does not necessarily mean that the person was fully employed during the whole quarter. Even a single week of employment within the quarter would be sufficient to generate an employer record. In view of this extended period over which the employment measurement is made, the number of exits and entrants is quite high. As many as 30 percent of females under age 24 exit in a single year; the smallest percentage of exits shown for any group in Table 4, about 7 percent, relates to males in what is presumably their period of highest employment, ages 25–59. Predictably, entrants are highest in the early age groups, and lowest in the ages after 60. About 35 to 40 percent of the younger age groups, and 60 to 70 percent of the middle and older age groups, have single, unchanged employers in successive years. The older age group does not appear to have significantly lower continuity of employment than the middle group.

With respect to sex differences, females do have a higher level of entrants and exits than do males. A more detailed age grouping would, of course, reflect the initial high entry, subsequent exit during the childbearing period, and gradual reentry from age 30 onward. In the period over age 60, the work-history pattern of females is amazingly similar to that of males.

In terms of race, nonwhites also have higher entry and exit rates, and a somewhat lower percentage with single employers, but these racial differences also fade out in the most advanced age group.

The work-history data thus suggest substantial churning of individuals in and out of employment, and the LEED data undoubtedly understate the actual amount of this churning, since lapses of employment which are less than one quarter are not captured. These changes in employment have implications for the change in total earnings. The employer is relieved of paying anything to those who leave his employment. On the other hand, he becomes now responsible for paying those who enter employment. In a static system, one would expect that the salaries of those who were retiring would be larger than those of new entrants, so that, on balance, employers would make a saving, which would be distributed among the employed workers as seniority increases. In this manner, everyone could receive an increase in pay without any increase in total earnings. In an expanding system, however, the larger size of new cohorts will mean that employment will be expanding, so that the payment to those entering may be larger than the saving on those retiring. In periods of increasing unemployment, on the other hand, one would expect that exits due to layoffs and reduced hirings would result in some

TABLE 4 Work History of Employed Workers 1957–58 and 1968–69 (Percent)

	Total Initial Year	Exits	Entrants	Unchanged Single Employers	Changed and Multiple Employers
1957–58:					
Under 25					
White male	100	17	26	44	40
White female	100	30	38	41	29
Nonwhite male	100	22	29	40	38
Nonwhite female	100	37	52	38	24
25–59					
White male	100	9	7	66	25
White female	100	17	18	64	19
Nonwhite male	100	11	11	55	43
Nonwhite female	100	21	20	59	20
60 and over					
White male	100	21	8	66	13
White female	100	21	12	67	12
Nonwhite male	100	20	7	63	17
Nonwhite female	100	20	12	61	17
1968–69:					
Under 25					
White male	100	12	32	36	51
White female	100	25	45	37	38
Nonwhite male	100	16	39	32	52
Nonwhite female	100	28	41	36	36
25–59					
White male	100	7	6	73	20
White female	100	14	16	64	22
Nonwhite male	100	10	10	52	38
Nonwhite female	100	15	18	56	29
60 and over					
White male	100	18	7	66	16
White female	100	19	8	69	12
Nonwhite male	100	11	7	58	30
Nonwhite female	100	21	11	59	20

SOURCE: Based on detailed tabulations of Appendix Tables A-1 and A-2.

net saving to the employer. The extent and magnitude of these changes in earnings are reflected in Table 5. In three years, 1957, 1960, and 1962, the reduction through exits did in fact exceed the increase through new entrants; this effect was primarily the result of recession and increasing unemployment. In two additional years, 1958 and 1963, there was an exact balance. In the remaining years, entrants' earnings exceeded exits' earnings, for some years by a substantial amount.

Payments to persons employed by unchanged single employers also contribute to the change in total earnings. It is illuminating to divide these people into two groups: those whose earnings decreased from one year to the next, and those whose earnings increased. Decreases in earnings come about mainly by reduction in overtime or shifting to part time. As Table 5 shows, decreases in earnings are not insignificant. From 1957 to 1958, the magnitude of decreases in earnings was almost equal to that of increases in earnings, and even in the most expansionary year, decreases were over one-third the size of increases. What this suggests is that the earnings of a substantial body of individuals are actually reduced even in periods of expansion. The net change in the earnings of people with changed or multiple employers also shows the same sort of pattern.

The process by which the total earnings in one year change to a new level of total earnings in the following year thus includes a variety of factors. The change from 1957 to 1958, for example, appears to be quite minor, from $189 billion to $190 billion, but the component elements involved in this change are quite large. Certainly the patterns of work history and the change in the structure of employment are considerably more important in determining total earnings than the average movement of the wage rate.

THE SIZE DISTRIBUTION OF EARNINGS

As a first approach to analyzing the behavior of the size distribution of earnings, it is useful to determine the effect upon that distribution over time of those individuals who leave employment (exits), and those who enter (entrants), as well as the changes in earnings of those who are continuously employed. Given the age profile of earnings, one might expect that those who exit from employment would have quite a different distribution of income from those who enter. Specifically, it would seem reasonable that those who leave employment would, on the average, have substantially higher incomes, and the variance of the size distribution of their earnings would be larger. Those who enter employment might be

TABLE 5 Year-to-Year Change in Total Earnings by Type of Change, 1957–69 (Billions of dollars)

Initial Year	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Initial total earnings	189	190	203	218	222	241	252	270	285	315	347	379
Earnings of exits	−16	−14	−13	−16	−15	−16	−16	−16	−16	−19	−22	−24
Earnings of entrants	+14	+14	+15	+13	+16	+15	+16	+18	+21	+23	+24	+27
Decreases by unchanged employers	−10	−7	−7	−10	−7	−9	−8	−11	−11	−10	−12	−12
Increases by unchanged employers	+11	+16	+15	+14	+18	+16	+19	+18	+26	+27	+31	+34
Net change by changed and multiple employers	+1	+4	+5	+3	+7	+5	+7	+6	+10	+11	+11	+13
Final total earnings	190	203	218	222	241	252	270	285	315	347	379	417
Final Year	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969

SOURCE: Based on Appendix Tables A-1 and A-2.

expected to be similar to each other, with lower earnings and smaller variance. An examination of what actually takes place, however, is presented in Table 6. The surprising finding is that, for all groups, exits and entrants have very much lower levels of income than do those who remain employed. This strongly suggests that the exits and entrants are not primarily those entering the labor force for the first time and those retiring from it permanently, but rather lower-paid individuals who come in and go out of employment on a transient basis. It is true that for white males the level of earnings for exits is generally higher than for entrants, but for white females the difference is very much smaller, and it is practically nonexistent for nonwhite males and females.

TABLE 6 Quartile Distributions of Earnings, 1957–58 and 1968–69, for Exits, Entrants, and Persons Employed Both Years, by Race and Sex

	1957–58			1968–69		
	Bottom Quartile	Median	Top Quartile	Bottom Quartile	Median	Top Quartile
White males						
Entrants	$ 700	$1,700	$3,600	$ 800	$1,900	$4,500
Exits	800	2,100	4,000	900	2,700	5,900
Employed both years	2,900	4,500	6,000	4,200	6,900	9,500
White females						
Entrants	500	1,300	2,400	700	1,800	3,400
Exits	600	1,400	2,500	700	1,900	3,700
Employed both years	1,600	2,600	3,500	2,300	3,800	5,200
Nonwhite males						
Entrants	500	1,200	2,300	700	1,700	3,500
Exits	500	1,300	2,300	600	1,700	3,600
Employed both years	1,700	2,700	4,000	2,400	4,300	6,400
Nonwhite females						
Entrants	500	1,000	1,700	700	1,700	3,200
Exits	500	1,000	1,700	600	1,400	2,800
Employed both years	1,000	1,700	2,500	1,600	3,000	4,300

SOURCE: Based on detailed tabulations of Appendix Table A-2.

Abstracting from the effect of exits and entrants, Figure 7 shows the change in the size distribution over time for employees with unchanged employers. In general, there has been some increase in inequality in the size distribution over time. Using the interquartile range as a percentage of the mean as a measure, dispersion increased from 1957 to 1968 from .69 to .77 for white males, from .73 to 76 for white females, from .85 to .93 for nonwhite males, and from .88 to .90 for nonwhite females. Such changes in inequality are not large, but they all are in the same direction. The differences among race and sex groups in inequality are also not large, with white males and females being the most equal, and nonwhite males and females the most unequal.

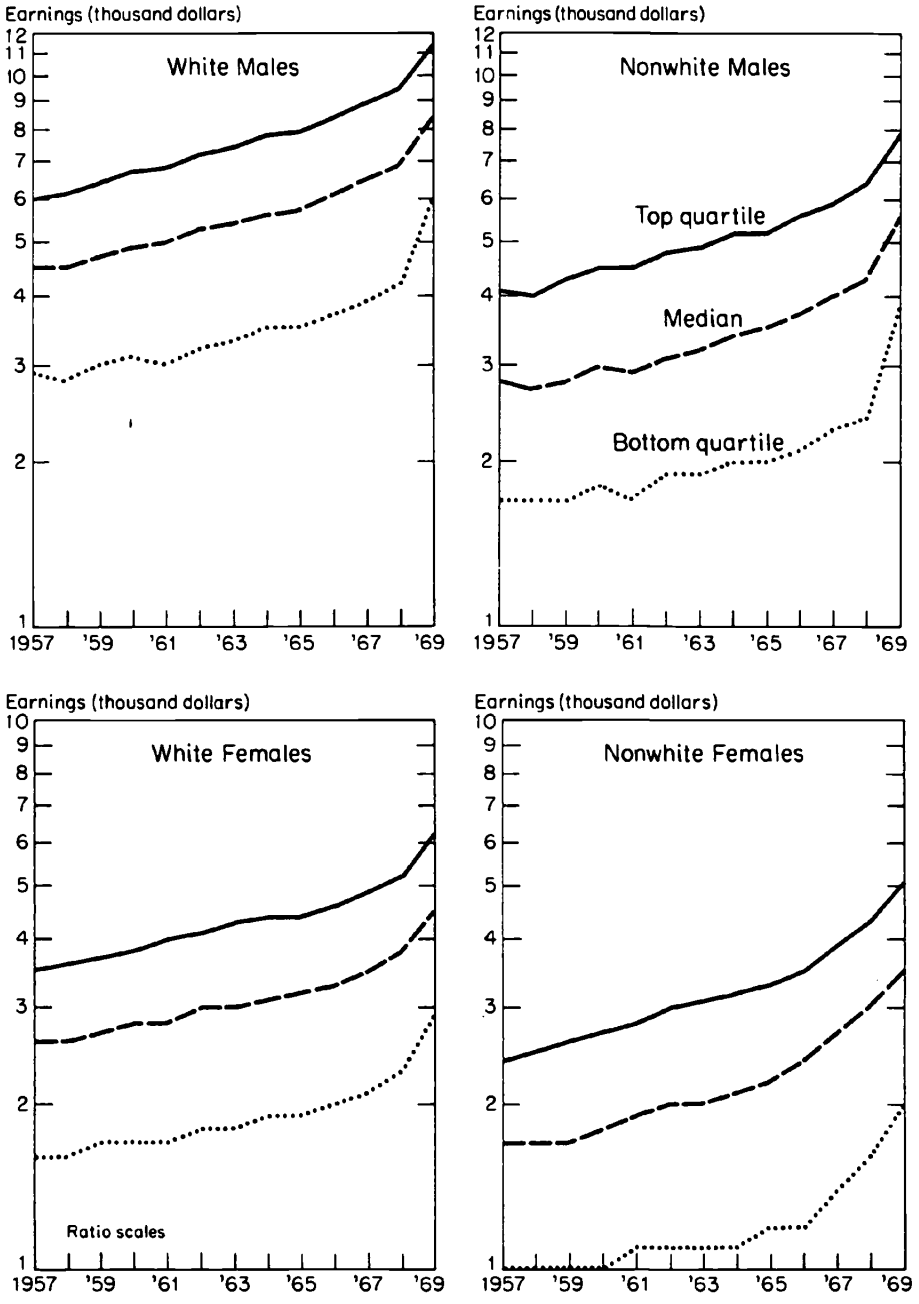
The age composition of the various race-sex groups obviously affects this measure of the dispersion of the size distribution of earnings. As Table 7 shows, if the quartile distributions are examined within specific

TABLE 7 Dispersion of Earnings by Age, Sex, and Race, 1968 (Persons employed in both 1968 and 1969)

	First Quartile	Median	Third Quartile	Quartile Difference as Percent of Mean
White males				
Age 60	$5,200	$7,400	$10,000	65
Age 45	6,200	8,500	11,500	62
Age 30	5,300	7,300	9,300	55
All ages	4,200	6,900	9,500	77
White females				
Age 60	2,900	4,100	5,700	68
Age 45	2,300	3,400	4,700	71
Age 30	2,500	4,000	5,500	75
All ages	2,300	3,800	5,200	76
Nonwhite males				
Age 60	3,300	4,700	6,600	70
Age 45	3,700	5,400	7,600	72
Age 30	3,500	4,800	6,700	67
All ages	2,400	4,300	6,400	93
Nonwhite females				
Age 60	1,100	2,300	3,600	109
Age 45	1,800	3,000	4,400	87
Age 30	2,100	3,400	4,800	79
All ages	1,600	3,000	4,300	90

SOURCE: Based on detailed tabulations of Appendix Table A-2.

FIGURE 7 Distribution of Earnings by Quartiles, 1957–69



ages for the different race-sex groups, there is a significant decline in the amount of observed inequality for some groups. As might be expected, the greatest reduction in inequality appears for males, since for them the age profile rises and falls more steeply. For females, there is less reduction in inequality, and in fact, for nonwhite females of age 60 the dispersion is greater than the average for all groups combined. What Table 7 does suggest is that the differential observed in the average level of male and female earnings does not result from a highly unequal male distribution consisting of both lower-paid males and higher-paid males, contrasted with a cluster of females who tend to receive approximately the same earnings. In point of fact, female earnings by age are more unequal than male earnings. Male earnings do become more unequal with advancing age, but even at their most unequal point, they are more equal than those of females at any of the ages shown. This finding may well be attributable in part to a larger incidence of part-time work among females.

Although examination of the interquartile differences and the median levels of income does show the substantial differences in the size distribution of income for the different races and sexes, an actual comparison of the percentage of individuals in the different income size classes by race and sex provides a sharper contrast. This is done in Table 8. Twenty-four percent of white males had incomes over $10,000 in

TABLE 8 Percentage of Individuals in Earnings Size Classes

	Under $3,000	$3,000–$10,000	Over $10,000	Total
White males	20	56	24	100
White females	39	59	2	100
Nonwhite males	34	60	6	100
Nonwhite females	51	47	2	100

SOURCE: Based on Appendix Table A-3.

1968, whereas only 2 percent of white females were in this class. Nonwhite males do considerably better than white females, having 6 percent in the over $10,000 class, but the percentage of nonwhite females matched that of white females exactly at this income level. However, 51 percent of nonwhite females were found in the lowest income class, i.e., under $3,000.

The apparent stability of the size distribution of earnings hides the churning at the level of the individual wage earner, which has already

been mentioned in connection with the examination of work history. This effect is summarized in Table 9 for race and sex groups for two different periods. In the recession period from 1957 to 1958, individuals who left employment, or suffered decreased or unchanged earnings, constituted approximately 50 percent of all workers, somewhat less for white males and females, and somewhat more for nonwhites. In contrast, in the period 1965–66, which was a period of upswing, between 60 and 65 percent of all individuals received increases, but even in this period the percentage with a decline or no change was appreciable, ranging from 25 to 30 percent over and above those who actually exited from employment. It should be recognized that the decreases in earnings are in most cases the result of individuals leaving employment during the course of the quarter,

TABLE 9 Percentage Distribution of Employees by Change in Earnings, 1957–58 and 1965–66

		Employed Both Years				
	Exits	With Decreases	No Change	With Increases	Entrants	Total
1957–58:						
White male	10	29	10	42	9	100
White female	17	21	9	36	17	100
Nonwhite male	15	30	9	34	12	100
Nonwhite female	19	19	14	29	19	100
1965–66:						
White male	7	21	6	56	10	100
White female	12	18	7	44	18	100
Nonwhite male	9	21	5	48	17	100
Nonwhite female	14	17	9	37	23	100

SOURCE: Based on Appendix Tables A-1 and A-2.

moving to a more part-time basis, or eliminating overtime. Some of the increase in earnings is due to a reversal of these factors. Whatever the cause, however, it is apparent from Table 9 that a substantial percentage of individuals is subject to earnings fluctuations due to the exits, decreases, increases, and entrances which take place.

The magnitude of the increases and decreases in earnings of individuals is, on the average, quite large. This is shown in Table 10, together with the percentage of employees in each year receiving increases and decreases.

The interesting aspect of these figures is the relative stability of both the average decrease in earnings and the average increase. While both tend to fluctuate, as would be expected, with economic conditions, the amount of fluctuation of either the average decreases or the average increases does not seem large relative to their average level, but the difference between them does fluctuate considerably. In the recession year of 1958, the average decline was 14 percent, whereas the average increase was 17 percent. In contrast, in 1967, the average decline fell to 10 percent, and the average increase rose to 20 percent. Perhaps even more important was the fact that only 52 percent of the individuals employed in both years received increases from 1957 to 1958, whereas 69 percent did so from 1966 to 1967. In other words, the net change in average earnings is the result of the level of decreases, the level of increases, and the relative number of employees receiving decreases and increases. If the analysis of wage behavior is to be meaningful, such structural characteristics as these must be explicitly built into the analysis; it cannot be based on the change in average earnings, assuming it to be representative of most employees, when in fact it is a net result of widely differing behavior. As has been pointed out, the LEED data do not permit an analysis of hours actually worked, so that it has not been possible to take this element into account

TABLE 10 Percentage of Employees with Decreases and Increases in Earnings and Percentage Change in Earnings, 1957–69

	No Change or Decrease		Increase		Net Percent Change in Average Earnings
	Percent of Employees	Percent Change in Earnings	Percent of Employees	Percent Change in Earnings	
1957–58	48	−14	52	17	1.0
1958–59	38	−14	62	19	6.6
1959–60	42	−12	58	19	5.4
1960–61	43	−14	57	18	2.9
1961–62	36	−11	64	19	6.9
1962–63	42	−12	58	17	4.1
1963–64	36	−11	64	18	6.2
1964–65	44	−11	56	18	3.8
1965–66	33	−11	67	20	7.5
1966–67	31	−10	69	20	8.0
1967–68	29	−12	71	19	8.2
1968–69	31	−12	69	20	8.4

SOURCE: Based on Appendix Table A-2.

in analyzing wage behavior. Nevertheless, it again seems apparent from the nature of the earnings distributions and their changes over time that variations in hours worked may be fully as important as the behavior of wage rates.

SUMMARY AND CONCLUSIONS

This study of the anatomy of earnings behavior has focused on four aspects: (1) age-earnings profiles and birth cohort earnings patterns; (2) sex and race differences in age profiles and earnings patterns; (3) work-history experience as related to age, sex, and race; and (4) the size distribution of earnings in terms of age, sex, and race, and its change over time.

The LEED data make it possible to trace both the shifts in age-earnings profiles over time and their relation to birth cohort patterns. For the period 1957 to 1969, each birth cohort enjoys a continual rise in average earnings over its lifetime. The shape of the age-earnings profile results from faster growth for younger generations than for older generations, each generation passing those older than itself and in turn being passed by still younger generations. In this way, the rise and fall observed in the age-earnings profile can be fully reconciled with ever-rising birth cohort earnings patterns.

The disaggregation of the age-earnings profiles and birth cohort patterns by race and sex reveals striking differences among the different groups. White males not only have substantially higher overall earnings, but their age-earnings profiles show a substantially faster rise to a peak and a greater subsequent decline to retirement age than is true for other groups. The age profile for nonwhite males is of similar shape, but it is substantially lower, and peaks earlier. White females, in contrast, have age-earnings profiles which decline slightly at the beginning of the childbearing ages, but subsequently continue to rise even during the period when the age-earnings profiles for both white and nonwhite males are declining, although white female earnings never attain even the nonwhite male level. The profile for nonwhite women does not reflect the childbearing decline observed for white females, but a decline does set in at approximately the same age as for nonwhite males. The level of the age-earnings profile for nonwhite females is lower than that of any other group.

Over time, age-earnings profiles have been shifting upward. In relative terms, the nonwhite profiles have shifted upward faster than the profiles for either white males or white females, thus narrowing the differential

between the race groups. The age-earnings profile of white females, however, has shifted up more slowly than that of white males, thus causing the differential between white male earnings and white female earnings to widen.

The birth cohort earnings patterns for the different sex-race groups demonstrate that the differentials do result from differential rates of growth in earnings. After the early twenties, earnings of females grow at an appreciably lower rate than those of males. Nonwhite males grow at a slower rate than white males, but pass white females in the mid-twenties. Like the birth cohort earnings patterns for the population as a whole, the individual sex-race birth cohort patterns do not decline, except for brief periods in recessions; recessions tend to affect males and in particular nonwhite males more than females. This recession effect may well be due to greater involvement of males in direct production work, which entails layoffs in periods of declining output.

Male work history exhibits the expected pattern of a rising percentage of employment as youths enter the labor force, a period of steady high level employment, and subsequent slow decline as a result of mortality and eventual retirement. For white females, in the childbearing years the percentage employed is reduced, although even at the lowest point the percentage employed is three-fifths as high as at its earlier peak. After the childbearing years, the percentage of women employed continues to rise until the mid-fifties, a good ten years longer than for men. Nonwhite females do not follow the pattern of white females, but instead the percentage employed rises steadily up to the mid-fifties.

Behind the percentage employed figures, there are in all cohorts a rather large number of both exits and entrants. Since the LEED data are based on quarterly employer reports, an exit is an individual who is employed in the first quarter of one year but not in the first quarter of the following year. Similarly, an entrant is a person who was not employed in the first quarter of one year but who was employed in the first quarter of the subsequent year. These definitions, of course, understate the actual amount of in and out movement that goes on; it is possible to be unemployed for several months and still be considered employed in both periods if the period of unemployment does not contain a complete calendar quarter. Data on the percentage of employed individuals whose earnings increase or decrease from one year to the next provide additional evidence of the importance of such changes in employment. Not only is the percentage of individuals whose earnings decline between two periods large, but the absolute level of the average decrease and average increase in earnings between two periods is also quite large. The usually fairly small average change in earnings is the net result of much larger movements in exits and entrants from employment, and

decreases and increases in earnings. Substantial fluctuations in earnings do occur even in periods when there is little apparent change in average earnings.

The size distribution of earnings moves upward in level over time, and, on the average, has become marginally more unequal. It is not true, however, that the differences in average income between males and females can be explained in terms of greater variation in male earnings. As measured by the interquartile difference in earnings in relation to the mean, the earnings of females in specific age groups vary more than those of males.

Deflation of current earnings by the Consumer Price Index does not alter the general conclusions, either for the year-to-year changes or for the whole period 1959–69. As would be expected, the deflated "real" changes in earnings are smaller than the current value changes, but since the same price deflator was used for all income levels and for all social and demographic groups, the structure of earnings behavior was unaffected by the deflation process.

The findings of this study have two important implications. First, demographic characteristics are central to an understanding of earnings differentials and the behavior of earnings over time. Second, work-history experience, its sensitivity to economic conditions, and its effect on earnings are important considerations for the analysis of policies related to income.

The importance of demographic factors for the determination of earnings has been generally recognized. A number of studies have adjusted age-sex-race groups for education, occupation, intelligence, skills, and other forms of human capital investment in an effort to explain, and in some cases to justify, the observed differentials. It may well be that cultural differences, differences in life-styles, differences in opportunities, and rational or irrational discrimination do account for the observed differences; it is not the function of this paper to discuss causality. Whatever the cause, however, it is important to recognize that some entire groups of individuals do receive less for their employment activities, and such differences are important in determining the distribution of income in our society.

The existence of substantial fluctuations in individual incomes from period to period is important because these irregularities do not necessarily reflect transitory elements. It has been popular for economists to concentrate on longer and longer time horizons, and to concern themselves with lifetime or permanent income. But for many members of the lower income classes it is not possible to shift resources easily from one time period to another. To be out of employment for a whole quarter may be quite serious for low-income individuals, and it is not possible for them

to dip into savings to maintain consumption on a temporary basis. In point of fact, their major form of saving may be payments on installment debt, or in some cases on home mortgages. To the extent that such commitments are fixed in the short run, the individual may be forced, paradoxically, to curtail his current consumption in order to maintain his saving rate. The LEED data, of course, do not aggregate individuals into family units, and do not consider other sources of income such as transfer payments or income in kind. Where there are several wage earners in a family or other kinds of family income are available, the impact of the fluctuations in earnings on living standards may be less severe, but it seems reasonable that for families in the lower income groups it is quite substantial. Perhaps for lower income groups it would be more reasonable to think in terms of a current income hypothesis, which would suggest that what is received is what is spent, and that current living standards fluctuate directly with current income. In contrast, the permanent income hypothesis is a rich man's theory. Consumption can only be determined in terms of long-run income expectations and the pattern of life-cycle needs when the lack of correspondence between current income and outlay can be made up either by using existing assets or by borrowing against the expectation of future income. For the lower income groups, it is quite possible that next month's income is irrelevant, to say nothing of next year's.

NOTE: As indicated in the text, figures underlying most of the tables are to be found in the appendix, Tables A-1 through A-3. The appendix appears on microfiche and is to be found at the back of the book. Duplicate microfiche cards can be obtained from Microfiche Systems Corporation, 440 Park Avenue South, New York, N.Y. 10016.

4 COMMENTS

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Nancy and Richard Ruggles have long advocated a closer integration of microanalytic information with national income and other macrodata in order to

gain more insights into the working of the economic system and to promote meaningful decision making by the major participants in the economy. Their article on the "Anatomy of Earnings" is a step in this direction.

It should be emphasized from the outset that the Ruggleses' paper is not intended to discuss causality, hence it is not based on a well-defined theoretical model. Its real contribution lies in organizing and analyzing an enormous body of detailed information on the economic and demographic characteristics of wage and salary earners and how they are related to the level and distribution of income within and among different groups over time. The underlying data base is the Social Security Administration's 1 percent LEED file. Included in this file are quarterly earnings data by age, sex, and color that cover a twelve-year period, 1957–69. The authors concentrate on the first quarter as an indication of annual earnings of covered workers. The first-quarter earnings are chosen presumably because they are not much affected by the payroll taxable limit (which has been rising over time) and because year-to-year changes in the first-quarter earnings are not biased by seasonal factors. Although the earnings generated from the LEED file are somewhat lower than those shown in the national income statistics (mainly because the LEED file does not cover most public employees or the self-employed), the two series seem to move fairly closely. Aside from coverage, the absence of information on occupation, education, marital status, or the number of hours worked by individuals is a limitation that has to be kept in mind when evaluating the results.

Four major areas are emphasized in the Ruggleses' paper: (a) the age and birth cohort earnings patterns of individuals, and their sensitivity to cylical fluctuations; (b) sex and color differences in the age and birth cohort earnings; (c) the work history of the various demographic groups, with emphasis on the entry into and exit from the labor force over their life cycle; and (d) the distribution of earnings by size, its relation to the demographic characteristics, and whether it changes significantly over time.

The authors reach many interesting conclusions, chief among which are the following:

1. Year-to-year changes in the age-earnings profile are affected by the pace of economic activity. This is reflected in the stationary or small earnings growth for all ages in the recession years of 1958 and 1961, and by the significant income gains in the second half of the 1960s, a period of rapid economic growth and rising employment. The level of economic activity seems also to have impacted the cohort earnings patterns. Workers who were born in 1911 and who entered the labor force around 1930 were found to have had much lower earnings potentials than those who were born in 1940. More significantly, recessions seem to affect the earnings of nonwhite males more adversely than those of other groups, perhaps because of their relatively heavy representation in durable manufacturing, an industry that tends to be hit by layoffs in periods of declining output.
2. Differences among the sex groups in the age-earnings profiles *narrowed* considerably over the 1957–69 period, *with nonwhite women's earnings showing the largest relative gain, followed by nonwhite males.* Incidentally, a similar conclusion was reached by Smith and Welch using the 1960

and 1970 censuses of population as a frame of reference. Ruggles and Ruggles also found that the earnings profiles of white women decline moderately in the early childbearing ages, but this phenomenon does not apply to nonwhite females, who may be forced to continue to work because of economic necessity.

3. There is substantial churning of individuals in and out of employment, and this has implications for earnings changes. Three generalizations appear relevant in this regard:
   a. A greater proportion of women than men enter and leave employment at all ages, especially the younger age groups. This, coupled with the relatively high incidence of part-time work among females, may partly explain why females' earnings by age are more unequal than male earnings. These could also be a factor in the observed differences in average income between males and females.
   b. *Nonwhites* have shown a greater tendency to change employers than white workers. This phenomenon, which holds especially true for nonwhite females, is perhaps another factor that may partly explain the reduced earnings gap between whites and nonwhites already alluded to.
   c. Year-to-year changes in total earnings are relatively small. These changes do, however, hide significantly large movements in specific components. In general, the loss in earnings which occurs when workers leave employment is largely offset by gain in earnings of entrants. Moreover, any decline in wages due to reduced overtime or a shift to part-time work tends to offset some of the gain in earnings that comes about through higher wage rates, longer weekly hours, and so forth. It is these net versus gross changes in earnings revealed by the microdata which give the paper under consideration special significance.
4. The authors found interesting things to say about the size distribution of earnings. There was, for example, a temporal increase in the inequality of the size distribution of earnings of various demographic groups with unchanged employers. Moreover, while the proportions of individuals who experience decreases and increases in their earnings change significantly from year to year, the average increase or decrease is relatively stable (Tables 9 and 10).

I only have a few comments, which I hope are relevant.

First, the *relative* size of the cohorts is not given explicit treatment by the Ruggleses. Other things remaining unchanged, if in one period there is a much greater influx of workers into the labor force than in another period (because of differences in birthrates), one would expect the earnings of the first group to grow much more slowly than those of the second group, at least during the first ten years of their working lives.

Second, one aspect of Figure 2 of the Ruggleses' paper is somewhat puzzling. Why should the 1911 cohort have a lower earnings potential than, say, the 1913 cohort, especially since members of the latter cohort entered the labor force at the trough of the depression of the 1930s? Does the relative size of the 1911

cohort explain its peculiar earnings pattern, reflecting perhaps a relatively large inflow of immigrants that year?

Third, the limit on the social security tax base, rising discontinuously from $4,200 in 1957 to $7,800 in 1969, puts an upper limit on the size of earnings included in the estimates of the first-quarter earnings at four times the tax base. This limitation introduced some small downward bias in the estimates of average annual earnings, but the bias is presumably concentrated in the white male group, ages 40 to 60. In the years during which the tax base was increased (by $600 in 1959, $1,800 in 1966, and $1,200 in 1968), some part of the reported increase in earnings for this group is a function only of the change in the tax base.

Fourth, Ruggles and Ruggles say little regarding the impact of earnings patterns of exit from or entry into *covered* employment. This aspect appears important for movements of military people (most of whom are young and black), especially during the Korean and Vietnam wars.

In conclusion, I would hope that efforts will be made to link the LEED file data with other socioeconomic data series available from the current population surveys, the 1970 census of population, and so on. These steps are necessary if we are to go into model building and policy simulation that link macro and micro aspects of the national economy.

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In their discussion of sex differentials in age-earnings profiles, Ruggles and Ruggles observe that one reason for the flattening of the female earnings profile relative to males at age 24 is that the proportional withdrawal of women during the childbearing ages is greater for women with higher incomes than for women with lower incomes.

Another, and perhaps more important, reason why female age-earnings profiles are relatively flat is that women are not promoted into higher-paying jobs as they obtain seniority. Women are viewed as having a weaker labor force attachment than men and are usually not given the opportunity to acquire the type of on-the-job training requisite to rising along a career ladder.

Although labor force participation rates are higher for low-income women during the childbearing years, labor force *attachment* is stronger for higher-paid women. That is, such women interrupt their employment less frequently and for shorter periods of time. This can be seen from Table 2 of the Ruggles and Ruggles paper. The proportion of 24-year-old women entering and leaving the labor force in 1963 was much higher for the lower-income groups than for the higher-income groups.

Yet, despite the fact that the higher-income females drop out less frequently than others, their earnings profiles do not show any greater tendency to rise with age. A woman is perceived to have a weak labor force commitment whether or not she ever drops out. Even if she never marries, her earnings profile will be flatter than a comparably qualified male, because by the time her labor force

commitment has been established (by her failure to marry), it is too late for her to acquire the necessary training for a position with a career ladder.

The segregation of women into sex-stereotyped occupations is one way of preventing women from improving their earnings as they age. However, even in male-dominated occupations, women hold a disproportionately small share of top-level positions. Clearly, the process is self-reinforcing. Women drop out because they hold boring and unchallenging jobs and see that they have nothing to gain from continuity in employment. Although the cultural values supportive of twenty-four-hour maternal care of preschool children are undoubtedly at work, the inverse relation between labor force attachment and earnings suggests that the nature of the employment experience is at fault as well. This behavior reinforces the employer's belief that women do not have a strong commitment to the job and, hence, the employer does not feel it is worthwhile to provide them with the on-the-job training requisite to career development.

The point to be made is that it is labor force attachment, not the participation rate of a cohort, that is most likely to affect its age-earnings profile. The fact that labor force attachment is stronger for higher-income women should produce a stronger upward pressure on overall age-earnings profiles in later years than if the reverse held true. Since this is not the case, one must conclude that traditional attitudes are more important in shaping an employer's expectations about the work commitment of female employees than differences in attitudes toward work of women themselves.